Series 1951, No. 10

Issued June 1961

SOIL SURVEY

Grant County Wisconsin

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
Soil Survey Division
WISCONSIN AGRICULTURAL EXPERIMENT STATION
University of Wisconsin

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of Grant County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; serve as a reference for students and teachers; help prospective farmers, land appraisers, bankers, and real estate agents to decide the worth of a particular farm; and will add to the soil scientist's fund of knowledge.

In making this survey soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in the growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, from these photographs, cartographers prepared the detailed soil map in the back of this report.

This soil survey is part of the technical assistance furnished by the Soil Conservation Service to the Grant County Soil Conservation District. Work on the survey was completed in 1951. Unless otherwise indicated all statements refer to conditions at the time the survey was in progress.

Locating the soils

Use the *index to map sheets* at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been located, it will be seen that boundaries of the soils are outlined and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. The symbol will be inside the area if there is enough room; otherwise, it will be outside the area and a pointer will show where the symbol belongs.

Finding information

Some readers will be more interested in one part of the report than another, for the report has special sections for different groups as well as sections that may be of value to all. The introductory part, which mentions climate and physiography and gives some information about water supplies and vegetation, will be of interest mainly to those not familiar with the county. Those not familiar with the county may also want to refer to the sections, Soil Associations, Agriculture, and Additional Facts About the County.

Farmers and those who work with farmers will be interested mainly in the section, Soil Descriptions, and in the section, Use and Management of the Soils. Study of these sections will aid them in identifying soils on a farm, in learning ways the soils can be managed, and in judging what yields can be expected. The guide to mapping units at the back of the report will simplify use of the map and the report. This guide gives the map symbol for each soil, the name of the soil, the page on which the soil is described, the capability unit in which the soil has been placed, and the page where the capability unit is described.

Engineers will want to refer to the section, Engineering Properties of the Soils. Tables in that section show characteristics of the soils that affect engineering.

Soil scientists will find information about how the soils were formed and how they were classified in the section, Formation and Classification of Soils.

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

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SOIL SURVEY OF GRANT COUNTY, WISCONSIN

REPORT BY GLENN H. ROBINSON AND A. J. KLINGELHOETS, SOIL CONSERVATION SERVICE

FIELDWORK BY GLENN H. ROBINSON, BUREL S. BUTMAN, AND OTHERS,[1] AND F. D. HOLE OF THE WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY, SOIL SURVEY DIVISION, AND THE WISCONSIN AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF WISCONSIN

GRANT COUNTY is largely agricultural. The agriculture is based mainly on the raising of livestock—hogs, dairy cattle, and beef cattle. Nearly one-fourth of the land in farms is woodland. The woodlands provide fuel for the farm homes and some cash income.

General Description of the County [2]

This section gives information of general interest to all readers. It tells about the physiography, relief, and drainage; the geology; climate; water supply; and vegetation. Details about agriculture are in the back part of the report in the section, Agriculture. Other facts of interest to those who are not familiar with the county will be found in the section, Additional Facts About the County.

Location and Extent

Grant County is in the southwestern corner of Wisconsin (fig. 1). It is bounded on the north by the Wisconsin River, beyond which are Crawford and Richland Counties. On the east it is bounded by Iowa and Lafayette Counties, and on the south, by Jo Daviess County, Ill. The Mississippi River, which separates the county from the State of Iowa, forms the western boundary.

The land area of Grant County is 1,168 square miles, or 747,520 acres. An additional 16 square miles, or 10,240 acres, consists of lakes, swamps, and other areas covered by water. Lancaster, the county seat, is near the center of the county.

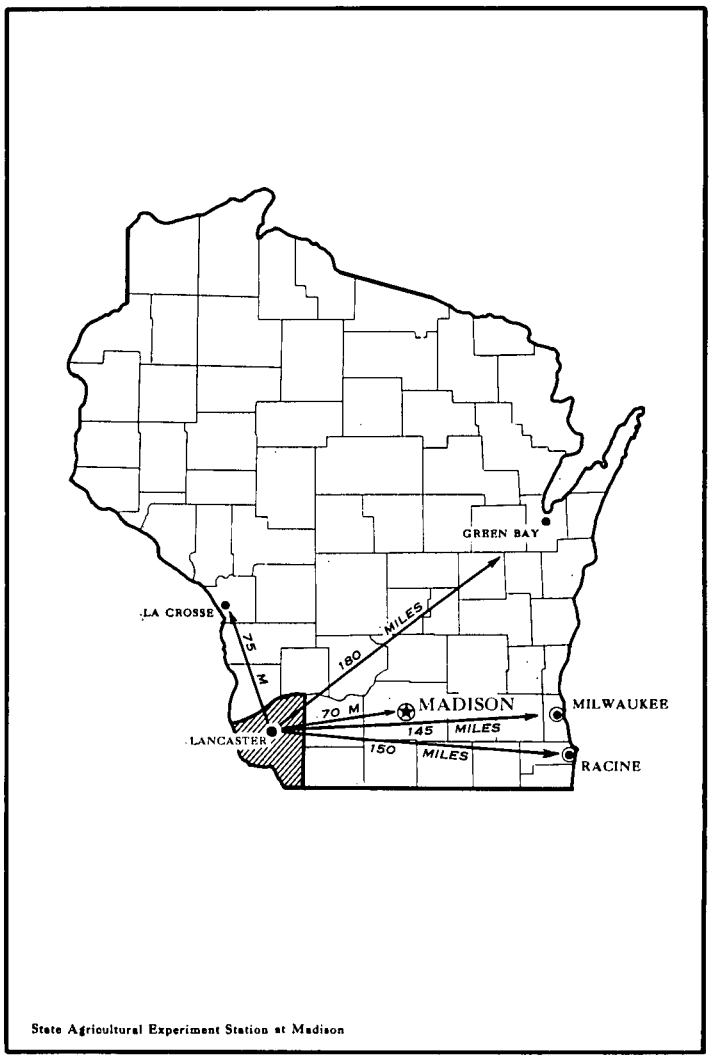

Figure 1.—Location of Grant County in Wisconsin.

Physiography, Relief, and Drainage

Grant County lies within the unglaciated part of Wisconsin. It is in the Western Upland physiographic re-

[1] GLENN H. ROBINSON, formerly of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering; ROBERT HOENE, DELBERT THOMAS, TOM TOMLINSON, and others of the area's former soil survey training center, Soil Conservation Service; and JAMES B. BEARDSLEY, R. B. COREY, RAYMOND L. NEWBURY, F. F. PETERSON, JAMES POMERENING, J. PHILLIP WATSON, and PAUL R. WESTIN of the Wisconsin Agricultural Experiment Station. Fieldwork for this survey was done when Soil Survey was part of the former Bureau of Plant Industry, Soils, and Agricultural Engineering; Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

[2] Figures 2, 3, and 4 in this section were prepared by F. D. HOLE, Soil Survey Division, University of Wisconsin, and were from SOIL SURVEY OF GRANT COUNTY, WISCONSIN. Bul. 80, Soil Survey Div., Wis. Geol. and Nat. Hist. Survey, Univ. of Wis., 1956.

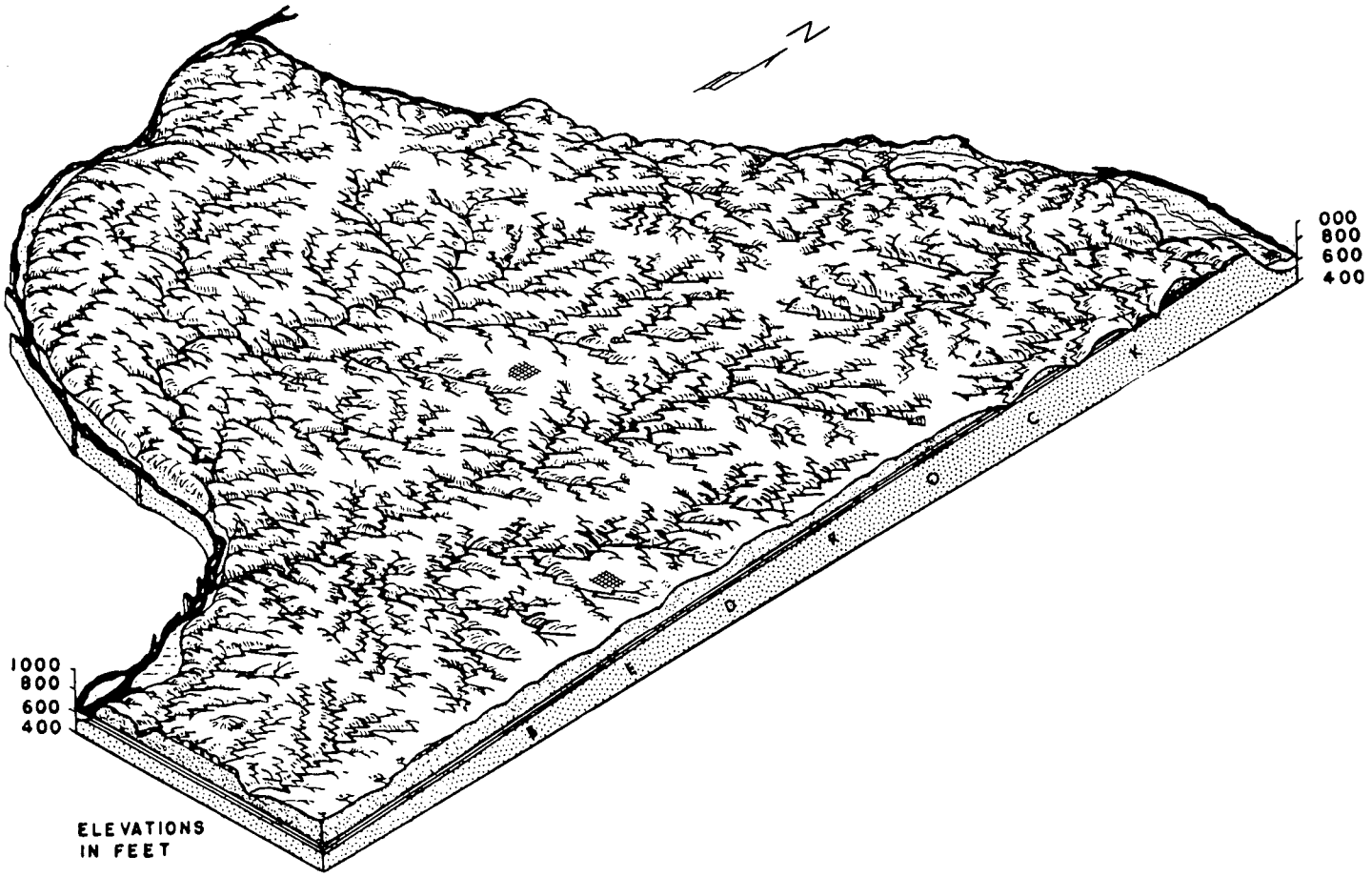

Figure 2.—**Relief map of Grant County, Wis., showing the major valleys and drainage pattern.**

gion (*4*).[3] In general, the county consists of a dissected plateau characterized by fairly broad, rolling ridges and steep-sided valleys (fig. 2).

The most striking topographical feature in the county is the steep escarpment that faces the Wisconsin River. The ridge above the escarpment is known as Military Ridge. This ridge extends through the towns of Montfort, Fennimore, Mount Ida, and Mount Hope. Reaching southward from its crest is a long, gentle back slope that has a drop in elevation of about 6 feet per mile. In the southern part of the county are prominent outcrops of shale capped with Niagara limestone. An example of such an outcrop is Sinsinawa Mound, which has an elevation of 1,185 feet.

The elevation of the various ridges in the county varies considerably. Military Ridge has the highest elevation—1,212 feet—at Mount Ida in the north-central part of the county. The ridge with the lowest elevation— 786 feet—is at Potosi, in the south-central part of the county. The elevation at Platteville, on a ridge in the southwestern part of the county, is 918 feet.

The bottoms of the valleys are at least 300 feet lower than the crests of the ridges and are ¼ mile to 2 miles wide. The valleys are the deepest and widest near the Wisconsin and Mississippi Rivers. Consequently, the elevation at Cassville, in the valley of the Mississippi River, is only 621 feet, and the elevation at Boscobel, in the valley of the Wisconsin River, is 670 feet. The elevation of the stream terraces above the present flood plain varies (*3*). The terraces generally have mild slopes, but the slopes are stronger in areas that are highly dissected by streams. In some areas streams have cut deep, steep-sided valleys.

Most parts of the county are well drained. The Mississippi River, which flows along the western boundary, is the largest river draining the area. The Wisconsin River, which flows along the northern boundary, carries drainage waters from the north side of Military Ridge to the Mississippi River. In the area south of Military Ridge, the Platte, Grant, and Sinsinawa Rivers and Sandy Creek and other small creeks provide drainage to the Mississippi River. Many of the smaller streams are fed by the numerous springs from which there is a permanent flow of water.

Geology

Galena and Platteville (Upper Magnesian) dolomite make up the larger part of the bedrock (fig. 3) that underlies Grant County (*4*). Fairly large areas of Prairie du Chien (Lower Magnesian) dolomite and Trempealeau, Franconia, and Dresbach (Upper Cambrian) sandstones are exposed in the northern part of

[3] Italic numbers in parentheses refer to Literature Cited, p. 94.

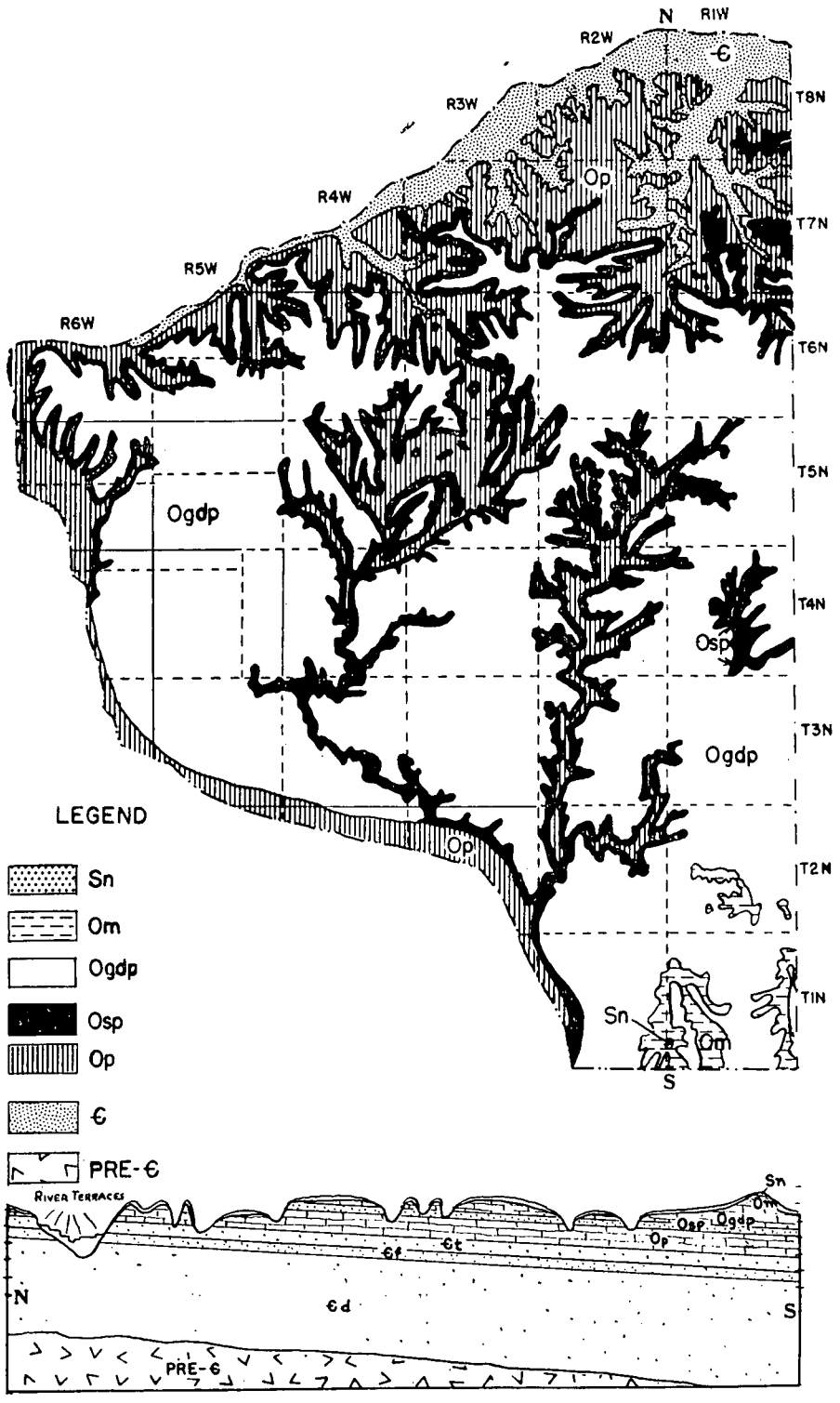

Figure 3.—Geology of Grant County, Wis.

Sn	Lower Silurian	Niagara dolomite	Op	Lower Ordovician	Prairie du Chien dolomite (Lower Magnesian) (270′)
Om	Upper Ordovician	Maquoketa shale (130′±)			
Ogdp	Middle Ordovician	Galena dolomite (230′) Decorah dolomite and shale (40′±) Platteville dolomite (60′)	€	Upper Cambrian	€t Trempealeau sandstone (150′±) €f Franconia sandstone (115′) €d Dresbach sandstone (600′)
Osp	Middle Ordovician	St. Peter sandstone (70′±)	PRE-€	Igneous and metamorphic rocks	

the county and along the bluffs of the Mississippi River. Outcrops of St. Peter sandstone occur between areas of Prairie du Chien dolomite and Galena and Platteville dolomite, especially in the central parts of the county and along the deeper valleys. Maquoketa shale underlies some soils in the towns of Jamestown, Hazel Green, and Smelser. The Hixton and Hesch soils have formed from materials weathered from exposed St. Peter and Trempealeau sandstones.

The nearly level bedding of the Lower Magnesian dolomite, which forms a cap over the Trempealeau sandstone, causes the ridges to be level on top. The dolomite slopes toward the south with a drop of about 5 or 6 feet per mile.

All of the uplands and many of the valley slopes and terraces are covered with a mantle of loess. This silty covering ranges from 1 to 22 feet in thickness. It probably was blown from the Mississippi River bottoms during or soon after glaciers covered the area. The deepest deposits are along the bluffs of the Mississippi River, but the deposits are thinner towards the northeastern corner of the county. The soils of the upland ridges have formed mainly in loess rather than from the underlying bedrock. The silt probably was calcareous at the time it was deposited. In many of the deep, loessal soils, free lime occurs in many places at depths of 5 feet or more.

On the lowest stream terraces, sandy glacial outwash is exposed. This forms the parent material of the Sparta soils. On the level, medium to high terraces along the Platte and other rivers, there are a few scattered areas of reddish-brown lacustrine clay—the parent material of the Medary soils. The lacustrine materials were laid down before the loess was deposited and underlie 1 to 5 feet of loess.

TABLE 1.—*Temperature and precipitation at Lancaster Station, Grant County, Wis.*

[Elevation, 1,080 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1901)	Wettest year (1938)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	22.4	62	−22	1.28	1.15	0.79	7.6
January	16.9	60	−29	1.12	.66	1.60	9.9
February	18.8	62	−30	1.17	1.08	1.90	7.5
Winter	19.4	62	−30	3.57	2.89	4.29	25.0
March	32.4	82	−14	1.91	2.83	5.87	8.4
April	46.4	91	10	2.88	1.07	2.65	1.9
May	58.4	104	23	4.03	2.92	5.94	.1
Spring	45.7	104	−14	8.82	6.82	14.46	10.4
June	67.4	100	35	4.14	1.30	6.21	(3)
July	72.7	108	42	3.77	1.66	4.37	(3)
August	70.3	103	34	3.36	.64	4.51	0
Summer	70.1	108	34	11.27	3.60	15.09	0
September	62.8	100	20	3.87	3.33	8.97	(3)
October	50.0	88	3	2.29	3.32	1.73	.4
November	35.0	77	−12	1.88	1.29	3.63	3.8
Fall	49.3	100	−12	8.04	7.94	14.33	4.2
Year	46.1	108	−30	31.70	21.25	48.17	39.6

[1] Average temperature based on a 63-year record, through 1955; highest and lowest temperatures on a 59-year record, through 1952.
[2] Average precipitation based on a 63-year record, through 1955; wettest and driest years based on a 63-year record, in the period 1891–1955; snowfall based on a 58-year record, through 1952.
[3] Trace.

Climate

The climate of Grant County is marked by wide extremes in temperature within seasons as well as between seasons. Table 1, compiled from records of the United States Weather Bureau at Lancaster, gives climatic data for the county.

Precipitation is distributed evenly throughout the county. Much of it falls as rain during the growing season, but in winter it falls chiefly in the form of snow. The snowfall is generally heavy, averaging about 40 inches. The average frost-free season is about 155 days, but it ranges from 123 to 204 days. The frost-free season is longer in areas near the Mississippi River than in the rest of the county. Although the growing season is generally short in Grant County, it is long enough for corn and other commonly grown crops to mature. Small grains and hay crops also grow well because they tolerate fairly low temperatures and light frosts.

Water Supply

This county has an abundant supply of underground water (*9*). All of the geological formations underlying the soils contain water. The Upper Cambrian sandstone is the principal source throughout the county, but, in the uplands in the central and eastern parts, wells driven only to the limestone provide an additional source of water. Also, in the alluvial fans in the valleys, water is obtained from shallow wells, and, in places, springs furnish an abundance of cold, clear water for domestic use. The springs are on the lower slopes of the valleys where strata of shale outcrop. Many of them are sources of permanent streams. The water obtained from wells and springs is hard and contains a moderate amount of minerals.

There is little need for irrigation in this county, but, should irrigation become necessary, water is available. Crops on some of the sandy soils near the Wisconsin and Mississippi Rivers would respond well to supplemental irrigation, and the rivers would provide a good supply of water. Other streams have a limited amount of water that could be used on the soils nearby that are suited to irrigation. The cost of pumping water from the deep valleys to the uplands would generally be prohibitive. Consequently, irrigation is likely to be limited to soils of the bottom lands and terraces.

Vegetation

Most of Grant County is in the region of Central Hardwood forests of the United States (*5*). Some of it, however, is in the prairie area that extends northward from Illinois. The county lies within an area, called a tension zone, in which minor changes in climate may cause changes in the vegetation. For example, if the climate becomes cooler or wetter than it is at the present time, the forests will encroach upon the prairie areas. On the other hand, if the climate becomes drier or warmer, the prairie grasses will encroach upon the forests.

Forests once covered much of the area, and marshes and swamps occupied a small acreage. Today the forests generally occupy areas that have rolling topography. The most extensive of the marshy and swampy areas are in the towns of Boscobel, Muscoda, Watterstown, and Wyalusing. The general distribution of the prairie and timber soils in Grant County is shown in figure 4.

The forests were probably encroaching upon the prairies when the white man first came into the area. Evidence of such extension can be seen in woods, consisting mainly of oak and hickory, that still have an understory of prairie plants. It is also apparent in the dark color of many soils, indicating that prairie grasses once covered the areas, and in the isolated prairie areas that are surrounded by forests. The rate at which the forests encroached was slowed by the Indians who burned the trees so they would have open areas for their campsites and fields. Prairie soils and transitional soils that have some characteristics of both prairie and timber soils occupy these burned-over areas and indicate their former location and extent. These areas are mainly near Hazel Green; in a strip that extends from Montfort and Patch Grove to Glen Haven; and along the Wisconsin River.

Wooded areas occur throughout the county. The trees are mainly hardwoods, with maple, oak, and hickory predominating. The few conifers grow mainly on the sandy soils near the rivers or are in Wyalusing State Park.

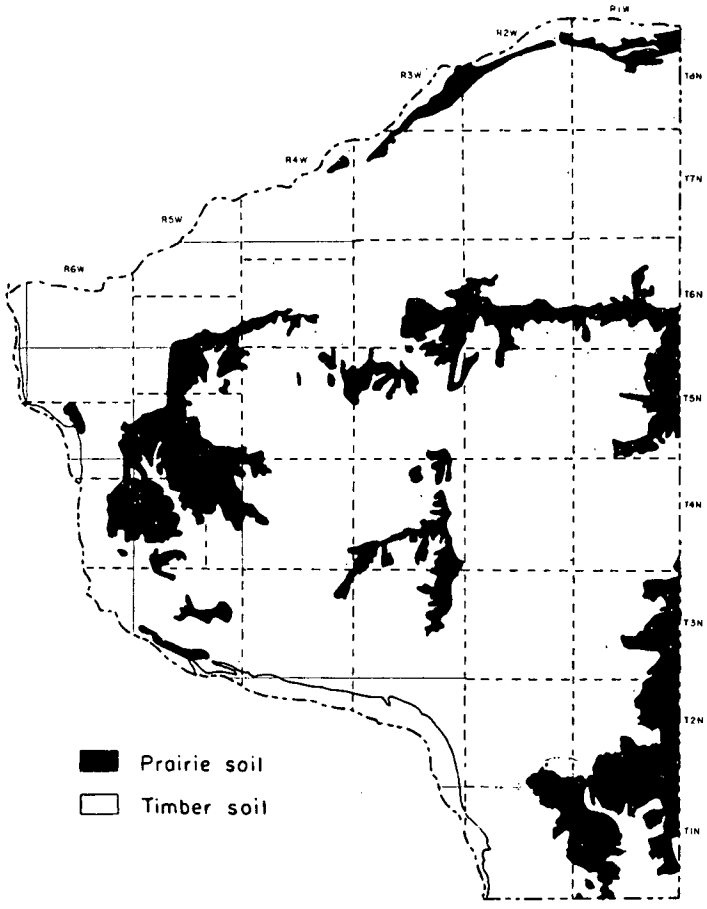

Figure 4.—Distribution of prairie and timber soils in Grant County, Wis.

How a Soil Survey Is Made

The scientist who makes a soil survey examines soils in the fields and woodlands. He classified the soils in accordance with the facts observed and maps their boundaries on an aerial photograph or other map. The map shows the location of each kind of soil identified, as well as the roads, houses, streams, railroads, and other natural and cultural features of the landscape.

Field study.—The soil scientist records everything about the soils that he believes might affect their suitability for farming. He examines surface soils and subsoils; measures slopes with a hand level; and notes differences in the growth of crops, weeds, trees, and other vegetation. He bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. As a rule, they are no more than a quarter of a mile apart, and in some areas they are much closer.

Each excavation reveals several distinct layers, called *soil horizons*, which collectively are known as the *soil profile* (fig. 5). Each horizon is studied to see how it differs from others in the profile and to learn the things about the soil that influence its capacity to support plant growth. In brief, as used in this report, the A_1 and A_2 horizons are referred to as the surface soil; the B horizon, as the subsoil; and the C horizon, in most places, as the substratum.

Color is normally related to aeration, drainage, and the amount of organic matter in the soil. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the relative proportions of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers. It is later checked by laboratory analysis. Texture determines how well the soil retains moisture and plant nutrients and whether it is easy or difficult to cultivate.

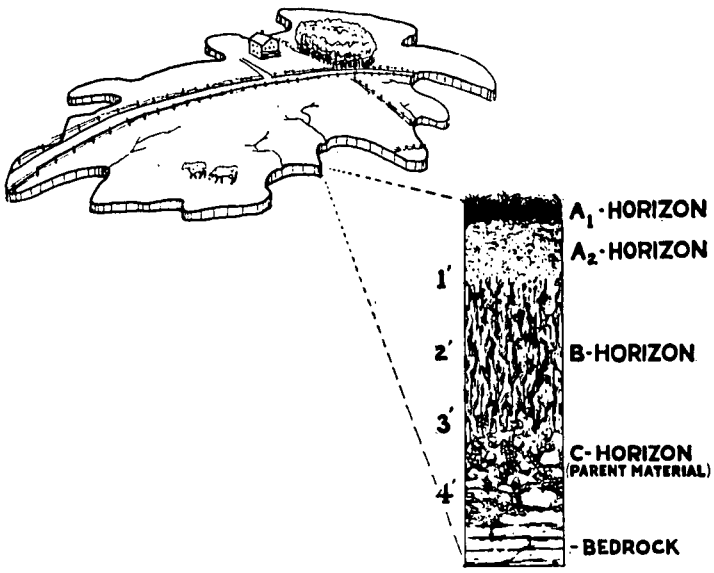

***Figure 5.*—Diagram of a soil profile showing the different layers. (Courtesy of Soil Survey Division, University of Wisconsin.)**

Structure is the way the individual soil particles are arranged in larger grains and the amount of pore (open) space between grains. Structure indicates the ease or difficulty with which the soil is penetrated by plant roots, water, and air.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether the soil is easy or difficult to keep open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil are the depth of the soil over bedrock or compact layers; the presence of gravel or stones that may interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has formed; the surface and internal drainage; and the reaction (acidity or alkalinity) of the soil as measured by chemical tests.

Classification.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified in types, series, and phases. The soil type is the basic unit of classification. A soil type may consist of several phases. Types that resemble each other in most characteristics are grouped in soil series.

Soil type.—Soils similar in kind, thickness, and arrangement of horizons, and having essentially the same texture in the surface soil, are classified as one soil type.

Soil series.—Two or more soil types that are similar in kind, thickness, and arrangement of soil layers are normally designated as a soil series. In some places, however, a soil series may be represented by only one soil type. Soil series normally are named for a place near which they were first mapped. For example, the Dubuque series is named for Dubuque, Iowa, because the soils of that series were first mapped near Dubuque.

Soil phase.—Soil types are frequently divided into phases because of differences other than those in kind, thickness, and arrangement of horizons. Frequently, these differences are significant in managing the soil. Among the characteristics that suggest dividing a soil type into phases are variation in slope, frequency of rock outcrop, degree of erosion, depth of soil over subsoil, and depth to parent material.

The soil phase (or the soil type if it has not been divided into phases) is the unit shown on the soil map. It is the unit that has the smallest range of characteristics. Use and management, therefore, can be specified for it more easily than for broader groups of soils that necessarily contain more variation.

Soil complex.—A soil complex consists of two or more soil types that are so intricately mixed they cannot be mapped separately at the scale of mapping used. They are, therefore, mapped together as a unit. In this county Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded, is a soil complex made up of areas of Atterberry and Downs soils that were too small to map separately.

Miscellaneous land types.—Areas that have little true soil, that are too inaccessible to be surveyed, or that for other reasons cannot feasibly be classified and mapped in detail, are not classified in types, series, or phases; they are identified by descriptive names. For example, in Grant County, Alluvial land is a miscellaneous land type.

Definitions.—Most of the words scientists use in describing soils are familiar, but some may have special meanings in soil science. Definitions of words used in the report are given in the Glossary, p. 93.

Soil Associations

The soil associations of Grant County are shown on the general soil map (fig. 6). Each association consists of a characteristic pattern of soils. The map is helpful in studying the soils of the county in general or in broad program planning. It is not detailed enough to be useful in studying the soils of a farm. Each association consists of the dominant soils described but also includes small areas of other soils, all arranged in a characteristic pattern. In most places the pattern is related to the nature of the soil materials and to the shape of the land surface. The six associations in Grant County are discussed briefly in the following pages.

Association 1

Deep, silty soils formed on uplands under grass or grass and trees: Tama, Downs, Muscatine

This soil association is made up of deep, silty soils that are nearly level to sloping. The soils are on broad ridge-

Explanation of figure 6.

1. **Deep, silty soils formed on uplands under grass or grass and trees: Tama, Downs, Muscatine.**
2. **Deep, silty soils formed on uplands under trees: Fayette, Seaton, Stronghurst.**
3. **Moderately deep or deep, silty or loamy soils underlain by limestone or sandstone: Dubuque, Dodgeville, Hixton.**
4. **Shallow, rocky or stony soils; limestone or sandstone materials: Dubuque, Sogn, Stony rock land.**
5. **Deep, sandy or loamy soils on terraces, underlain by sandy outwash: Sparta, Meridian, Dakota.**
6. **Soils on flood plains subject to overflow: Arenzville, Orion, Alluvial land.**

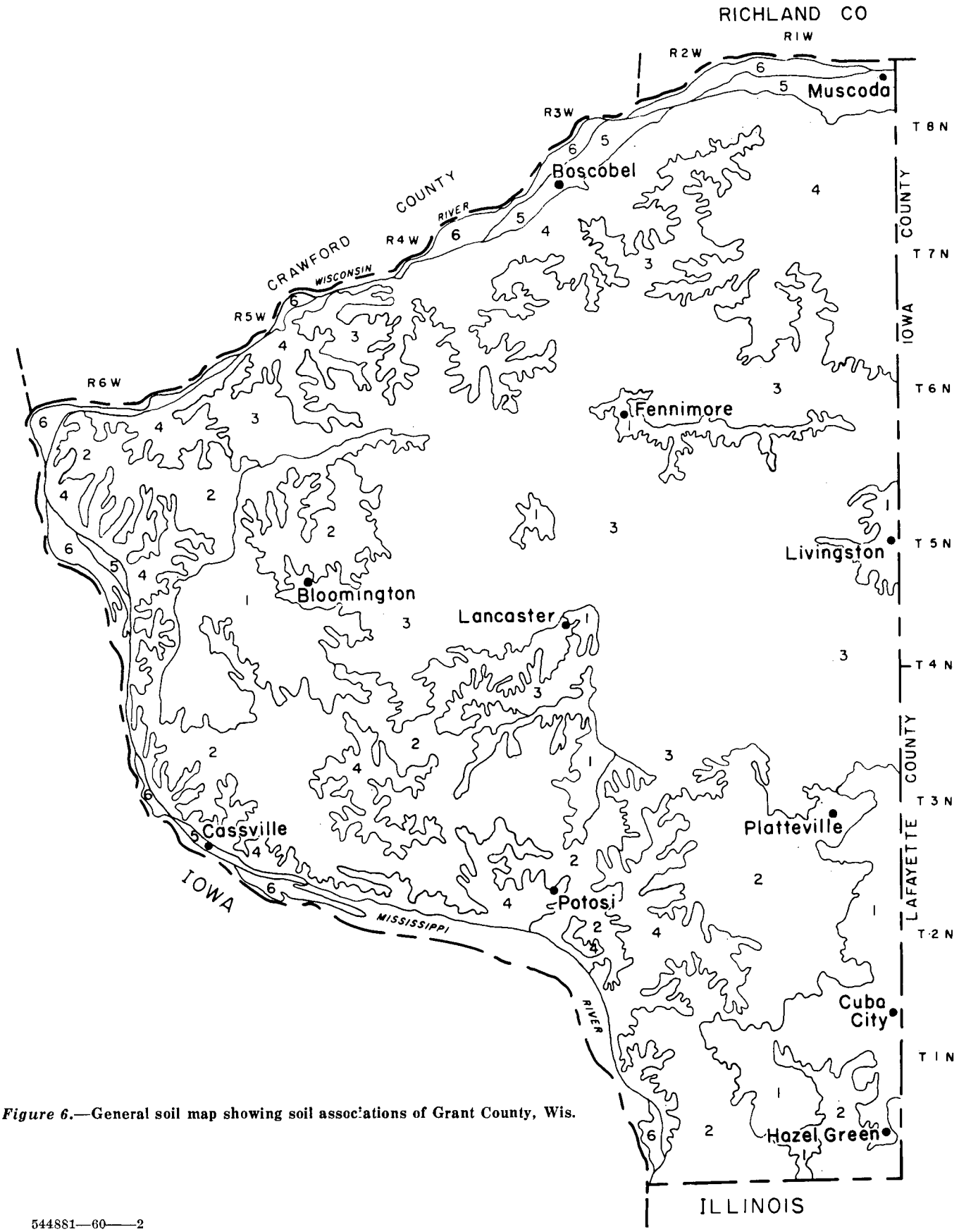

Figure 6.—General soil map showing soil associations of Grant County, Wis.

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tops in all but the northern part of the county. The Tama, Downs, and Muscatine soils are predominant in this association. They have formed primarily in windblown silt, also called loess, that overlies reddish clay at depths below 3½ to 4 feet. The clay was derived from weathered limestone, and, in many places, it contains numerous fragments of chert.

The Tama and Muscatine soils have formed under prairie. As a result, they have a darker surface layer than the Downs soils, which formed under a mixed cover of prairie and forest vegetation.

The soils in this association are easy to manage. They are among the best soils for agriculture in the county.

Association 2

Deep, silty soils formed on uplands under trees: Fayette, Seaton, Stronghurst

The soils in this association are deep and silty and are nearly level to strongly sloping. They occur in the southern and western parts of the county on upland ridges that border the Mississippi River. The soils of the Fayette, Seaton, and Stronghurst series are predominant in this association.

These soils have formed mainly in materials similar to the parent material of the Tama, Muscatine, and Downs soils of soil association 1. The Seaton soils, however, have formed in coarser textured silt. Because the soils have formed under a cover of trees, they have a lighter colored surface layer than the Tama, Muscatine, and Downs soils.

The soils in this association are suited to agriculture. They require more careful use and management than the soils in association 1.

Association 3

Moderately deep or deep, silty or loamy soils underlain by limestone or sandstone: Dubuque, Dodgeville, Hixton

This soil association is made up largely of Dubuque, Dodgeville, and Hixton soils, but it also includes some Gale and Hesch soils. Most of the association is in the northern and central parts of the county.

The Dubuque and Dodgeville soils occur on sloping, upland ridges. They have formed in silt that overlies reddish clay. The clay was derived from weathered limestone, and, in many places, it contains fragments of chert. The Dubuque soils have formed under forest and have a lighter colored surface layer than that of the Dodgeville soils, which formed under prairie.

The Gale, Hixton, and Hesch soils are on valley slopes below the ridgetops. The Gale soils have formed in silt that is underlain by weathered sandstone at depths of less than 3 feet. The Hixton and Hesch soils have formed mainly from sandstone, but they also contain some finer material. Their surface layer is loam or fine sandy loam. The Hesch soils have formed under a mixed cover of prairie and timber. They have a darker colored surface soil and a browner subsoil than the Hixton soils.

The soils in this association are likely to erode. Consequently, their use for agriculture is somewhat limited. If well managed, however, these soils are very productive.

Association 4

Shallow, rocky or stony soils; limestone or sandstone materials: Dubuque, Sogn, Stony rock land

The soils in this association are steep and are shallow over limestone and sandstone bedrock. They occur on slopes along the major streams and between the valley slopes and upland ridges. The soils are stony. Outcrops of rock occur in many places.

The Dubuque and Sogn soils have formed in silt derived from similar materials. The Dubuque soils have formed under forest, and the Sogn, under prairie. Stony rock land consists of hilly areas that have sandstone and limestone outcrops in many places.

Some areas of the Dubuque and Sogn soils are suited to cultivated crops. Generally, however, most of this association is best suited to pasture or trees.

Association 5

Deep, sandy or loamy soils on terraces, underlain by sandy outwash: Sparta, Meridian, Dakota

This soil association is made up mainly of Sparta, Meridian, and Dakota soils. The soils are deep and are underlain by sandy outwash. They occur on stream benches, or terraces, above the flood plains of major streams in the county, mostly along the Wisconsin and Mississippi Rivers.

The Sparta soils have formed under prairie on low stream terraces. They have a dark-colored surface soil and no textural B horizon.

The Meridian and Dakota soils have a surface soil of loam or fine sandy loam. Their B horizon is moderately developed. Loose sand underlies these soils at depths between 24 and 38 inches. The Meridian soils have developed under forest and are lighter colored than the Dakota soils, which formed under prairie.

The soils in this association are used intensively. They are likely to be droughty but are productive if well managed.

Association 6

Soils on flood plains subject to overflow: Arenzville, Orion, Alluvial land

Nearly level areas of Arenzville, Orion and Alluvial land are predominant in this soil association. The areas are on flood plains where they are likely to be flooded by overflow from adjacent streams. The water table is generally high.

Except for Alluvial land, which is poorly drained and subject to frequent overflow, it is feasible to cultivate most areas of this association.

Soil Descriptions

This section is provided for those who want detailed information about the soils. It describes each soil, or mapping unit, in this county; that is, the areas on the detailed soil map that are bounded by lines and identified

by a letter symbol. For more general information about the soils, the reader can refer to the section, Soil Associations, in which broad patterns of soils are described.

In this section the soils are described approximately in alphabetic order. All the soils of one series that have the same texture in the surface layer are together. For example, all the Hesch soils that have a fine sandy loam surface layer come together and then all the Hesch soils that have a loam surface layer. The descriptions of color and consistence are those of moist soil. Terms used to describe the soils are defined in the Glossary.

A list of the soils mapped is given at the back of this report, along with the capability unit of each. The approximate acreage and proportionate extent of the soils are given in table 2. Their location and distribution are shown on the soil map at the back of this report.

TABLE 2.—*Approximate acreage and proportionate extent of soils mapped*

Soil	Acres	Percent	Soil	Acres	Percent
Alluvial land	15, 446	2. 1	Downs silt loam, 6 to 10 percent slopes, moderately eroded	670	0. 1
Arenzville silt loam	44, 042	5. 9	Downs silt loam, 10 to 15 percent slopes, moderately eroded	220	(1)
Atterberry silt loam, 0 to 2 percent slopes	262	(1)	Downs silt loam, 10 to 15 percent slopes, severely eroded	74	(1)
Atterberry silt loam, 2 to 6 percent slopes	221	(1)	Dubuque silt loam, 2 to 6 percent slopes	220	(1)
Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded	1, 019	. 1	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	300	(1)
Bertrand silt loam, 0 to 2 percent slopes	919	. 1	Dubuque silt loam, 6 to 10 percent slopes	450	. 1
Bertrand silt loam, 2 to 6 percent slopes	289	(1)	Dubuque silt loam, 6 to 10 percent slopes, moderately eroded	4, 850	. 6
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	668	. 1	Dubuque silt loam, 10 to 15 percent slopes	1, 940	. 3
Bertrand silt loam, 6 to 10 percent slopes	173	(1)	Dubuque silt loam, 10 to 15 percent slopes, moderately eroded	16, 859	2. 3
Bertrand silt loam, 6 to 10 percent slopes, moderately eroded	290	(1)	Dubuque silt loam, 15 to 20 percent slopes	4, 350	. 6
Bertrand silt loam, 10 to 15 percent slopes, moderately eroded	80	(1)	Dubuque silt loam, 15 to 20 percent slopes, moderately eroded	13, 700	1. 8
Chaseburg silt loam, 0 to 3 percent slopes	4, 550	. 6	Dubuque silt loam, 20 to 30 percent slopes	8, 750	1. 2
Chaseburg silt loam, 3 to 6 percent slopes	4, 310	. 6	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded	9, 400	1. 3
Chaseburg silt loam, 6 to 15 percent slopes	156	(1)	Dubuque silt loam, 30 to 45 percent slopes	2, 690	. 4
Chelsea fine sand, 0 to 6 percent slopes, eroded	40	(1)	Dubuque silt loam, deep, 2 to 6 percent slopes	720	. 1
Chelsea fine sand, 6 to 10 percent slopes, eroded	220	(1)	Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	5, 600	. 7
Chelsea fine sand, 10 to 15 percent slopes, eroded	940	. 1	Dubuque silt loam, deep, 6 to 10 percent slopes	890	. 1
Curran silt loam	280	(1)	Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded	22, 800	3. 1
Dakota fine sandy loam, 0 to 2 percent slopes	314	(1)	Dubuque silt loam, deep, 10 to 15 percent slopes	4, 170	. 6
Dakota fine sandy loam, 2 to 6 percent slopes	210	(1)	Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded	23, 623	3. 2
Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded	45	(1)	Dubuque silt loam, deep, 15 to 20 percent slopes	5, 450	. 7
Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded	380	. 1	Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded	8, 350	1. 1
Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded	890	. 1	Dubuque silt loam, deep, 20 to 30 percent slopes	2, 460	. 3
Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded	220	(1)	Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded	1, 120	. 1
Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded	220	(1)	Dubuque silt loam, deep, 30 to 45 percent slopes	1, 490	. 2
Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded	1, 190	. 2	Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded	370	(1)
Dodgeville silt loam, deep, 6 to 10 percent slopes	274	(1)	Dubuque soils, 6 to 10 percent slopes, severely eroded	1, 570	. 2
Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded	3, 070	. 4	Dubuque soils, 10 to 15 percent slopes, severely eroded	10, 300	1. 4
Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded	2, 540	. 3	Dubuque soils, 15 to 20 percent slopes, severely eroded	7, 440	1. 0
Dodgeville silt loam, deep, 15 to 20 percent slopes	220	(1)	Dubuque soils, 20 to 30 percent slopes, severely eroded	1, 040	. 1
Dodgeville soils, 6 to 10 percent slopes, severely eroded	220	(1)	Dubuque soils, deep, 2 to 6 percent slopes, severely eroded	970	. 1
Dodgeville soils, 10 to 15 percent slopes, severely eroded	1, 180	. 2	Dubuque soils, deep, 6 to 10 percent slopes, severely eroded	16, 300	2. 2
Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded	140	(1)	Dubuque soils, deep, 10 to 15 percent slopes, severely eroded	14, 700	2. 0
Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded	1, 780	. 2	Dubuque soils, deep, 15 to 20 percent slopes, severely eroded	2, 620	. 4
Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded	2, 150	. 3	Dubuque soils, deep, 20 to 30 percent slopes, severely eroded	220	(1)
Downs silt loam, 2 to 6 percent slopes, moderately eroded	3, 640	. 5			
Downs silt loam, 2 to 6 percent slopes, severely eroded	280	(1)			
Downs silt loam, 6 to 10 percent slopes	274	(1)			

See footnotes at end of table.

TABLE 2.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Acres	Percent
Dubuque stony silt loam, 10 to 15 percent slopes	320	(1)
Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded	480	0. 1
Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded	520	. 1
Dubuque stony silt loam, 20 to 30 percent slopes	660	. 1
Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded	370	(1)
Dubuque stony silt loam, 30 to 45 percent slopes	4, 948	. 7
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	22, 774	3. 0
Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded	3, 200	. 4
Fayette silt loam, uplands, 6 to 10 percent slopes	1, 840	. 2
Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded	35, 175	4. 7
Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded	32, 053	4. 3
Fayette silt loam, uplands, 10 to 15 percent slopes	4, 200	. 6
Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded	15, 700	2 1
Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded	17, 600	2. 4
Fayette silt loam, uplands, 15 to 20 percent slopes	1, 540	. 2
Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded	2, 520	. 3
Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded	1, 120	. 1
Fayette silt loam, uplands, 20 to 30 percent slopes	2, 950	. 4
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded	3, 290	. 4
Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded	370	(1)
Fayette silt loam, valleys, 6 to 10 percent slopes	265	(1)
Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded	357	(1)
Fayette silt loam, valleys, 10 to 15 percent slopes	378	. 1
Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded	570	. 1
Fayette silt loam, valleys, 15 to 20 percent slopes	552	. 1
Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded	690	. 1
Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded	314	(1)
Fayette silt loam, valleys, 20 to 30 percent slopes	586	. 1
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded	557	. 1
Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded	545	. 1
Gale silt loam, 2 to 10 percent slopes	380	. 1
Gale silt loam, 2 to 10 percent slopes, moderately eroded	250	(1)
Gale silt loam, 2 to 10 percent slopes, severely eroded	2, 570	. 3
Gale silt loam, 10 to 15 percent slopes, moderately eroded	1, 800	. 2
Gale silt loam, 10 to 15 percent slopes, severely eroded	2, 400	. 3
Gale silt loam, 15 to 20 percent slopes, moderately eroded	600	. 1
Gale silt loam, 15 to 20 percent slopes, severely eroded	1, 350	. 2
Gale silt loam, 20 to 30 percent slopes	740	. 1
Gale silt loam, 20 to 30 percent slopes, moderately eroded	370	(1)
Garwin silty clay loam	158	(1)
Hesch loam, 2 to 10 percent slopes, moderately eroded	470	0. 1
Hesch loam, 10 to 15 percent slopes, moderately eroded	320	(1)
Hesch loam, 15 to 20 percent slopes, moderately eroded	174	(1)
Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded	174	(1)
Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded	192	(1)
Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded	210	(1)
Hesch fine sandy loam, 15 to 20 percent slopes	144	(1)
Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded	259	(1)
Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded	123	(1)
Hesch fine sandy loam, 20 to 45 percent slopes	197	(1)
Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded	388	. 1
Hixton loam, 2 to 10 percent slopes	174	(1)
Hixton loam, 2 to 10 percent slopes, moderately eroded	240	(1)
Hixton loam, 10 to 15 percent slopes, moderately eroded	740	. 1
Hixton loam, 10 to 15 percent slopes, severely eroded	810	. 1
Hixton loam, 15 to 20 percent slopes, moderately eroded	810	. 1
Hixton loam, 15 to 20 percent slopes, severely eroded	220	(1)
Hixton loam, 20 to 30 percent slopes	370	(1)
Hixton loam, 20 to 30 percent slopes, moderately eroded	520	. 1
Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded	860	. 1
Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded	1, 230	. 2
Hixton fine sandy loam, 10 to 15 percent slopes	420	. 1
Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded	970	. 1
Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded	1, 520	. 2
Hixton fine sandy loam, 15 to 20 percent slopes	580	. 1
Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded	2, 470	. 3
Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded	520	. 1
Hixton fine sandy loam, 20 to 30 percent slopes	2, 390	. 3
Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded	2, 080	. 3
Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded	2, 380	. 3
Hixton fine sandy loam, 30 to 45 percent slopes	660	. 1
Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded	420	. 1
Jackson silt loam, 0 to 2 percent slopes	356	(1)
Jackson silt loam, 2 to 6 percent slopes	277	(1)
Jackson silt loam, 2 to 6 percent slopes, moderately eroded	196	(1)
Jackson silt loam, 6 to 10 percent slopes, moderately eroded	188	(1)
Judson silt loam, 0 to 3 percent slopes	2, 360	. 3
Judson silt loam, 3 to 10 percent slopes	2, 360	. 3
Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded	171	(1)
Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded	218	(1)
Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded	152	(1)
Lamont fine sandy loam, 15 to 20 percent slopes	188	(1)

See footnotes at end of table.

TABLE 2.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Acres	Percent
Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded	163	(1)
Lamont fine sandy loam, 20 to 45 percent slopes	176	(1)
Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded	71	(1)
Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded	215	(1)
Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded	214	(1)
Marsh	2, 237	0. 3
Medary silt loam, 0 to 2 percent slopes	179	(1)
Medary silt loam, 2 to 6 percent slopes, moderately eroded	492	. 1
Medary silt loam, 6 to 10 percent slopes, moderately eroded	277	(1)
Medary silt loam, 10 to 15 percent slopes, moderately eroded	187	(1)
Medary soils, 6 to 10 percent slopes, severely eroded	139	(1)
Meridian loam, 0 to 2 percent slopes	391	. 1
Meridian loam, 2 to 6 percent slopes	318	(1)
Meridian loam, 2 to 6 percent slopes, moderately eroded	151	(1)
Meridian loam, 6 to 10 percent slopes, moderately eroded	206	(1)
Meridian loam, 10 to 15 percent slopes, moderately eroded	157	(1)
Meridian fine sandy loam, 0 to 2 percent slopes	398	. 1
Meridian fine sandy loam, 2 to 6 percent slopes	323	(1)
Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded	246	(1)
Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded	172	(1)
Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded	149	(1)
Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded	198	(1)
Muscatine silt loam, 0 to 2 percent slopes	923	. 1
Muscatine silt loam, 2 to 6 percent slopes	967	. 1
Muscatine silt loam, 2 to 6 percent slopes, moderately eroded	453	. 1
Orion silt loam	4, 940	. 7
Richwood silt loam, 0 to 2 percent slopes	360	(1)
Richwood silt loam, 2 to 6 percent slopes	300	(1)
Rozetta silt loam, 6 to 10 percent slopes	380	. 1
Rozetta silt loam, 6 to 10 percent slopes, moderately eroded	280	(1)
Seaton silt loam, 2 to 6 percent slopes	340	(1)
Seaton silt loam, 2 to 6 percent slopes, moderately eroded	1, 110	. 1
Seaton silt loam, 6 to 10 percent slopes, moderately eroded	3, 220	. 4
Seaton silt loam, 6 to 10 percent slopes, severely eroded	3, 100	. 4
Seaton silt loam, 10 to 15 percent slopes	810	. 1
Seaton silt loam, 10 to 15 percent slopes, moderately eroded	3, 220	. 4
Seaton silt loam, 10 to 15 percent slopes, severely eroded	1, 490	. 2
Seaton silt loam, 15 to 20 percent slopes	2, 080	. 3
Seaton silt loam, 15 to 20 percent slopes, moderately eroded	660	. 1
Seaton silt loam, 15 to 20 percent slopes, severely eroded	280	(1)
Seaton silt loam, 20 to 45 percent slopes	6, 500	0. 9
Seaton silt loam, 20 to 45 percent slopes, moderately eroded	2, 500	. 3
Sogn silt loam, 2 to 10 percent slopes, moderately eroded	740	. 1
Sogn silt loam, 10 to 15 percent slopes	540	. 1
Sogn silt loam, 10 to 15 percent slopes, moderately eroded	1, 560	. 2
Sogn silt loam, 15 to 20 percent slopes	3, 220	. 4
Sogn silt loam, 15 to 20 percent slopes, moderately eroded	1, 180	. 2
Sogn loam, 10 to 15 percent slopes	320	(1)
Sogn loam, 10 to 15 percent slopes, moderately eroded	460	. 1
Sogn loam, 15 to 20 percent slopes, moderately eroded	590	. 1
Sparta loamy fine sand, 0 to 2 percent slopes	15, 800	2. 1
Sparta loamy fine sand, 0 to 2 percent slopes, eroded	520	. 1
Sparta loamy fine sand, 2 to 6 percent slopes	620	. 1
Sparta loamy fine sand, 2 to 6 percent slopes, eroded	660	. 1
Sparta loamy fine sand, 6 to 15 percent slopes	1, 690	. 2
Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes	660	. 1
Sparta fine sand and Dune land, 6 to 15 percent slopes	2, 950	. 4
Sparta fine sand and Blown-out land, 6 to 15 percent slopes	2, 350	. 3
Stony colluvial land	3, 690	. 5
Stony rock land, steep	11, 427	1. 5
Stony rock land, very steep	83, 640	11. 2
Stronghurst silt loam, 2 to 6 percent slopes	1, 290	. 2
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded	920	. 1
Tama silt loam, 0 to 2 percent slopes	2, 090	. 3
Tama silt loam, 2 to 6 percent slopes	3, 370	. 5
Tama silt loam, 2 to 6 percent slopes, moderately eroded	37, 000	4. 9
Tama silt loam, 2 to 6 percent slopes, severely eroded	5, 450	. 7
Tama silt loam, 6 to 10 percent slopes, moderately eroded	15, 200	2. 0
Tama silt loam, 6 to 10 percent slopes, severely eroded	13, 500	1. 8
Tama silt loam, 10 to 15 percent slopes	1, 620	. 2
Tama silt loam, 10 to 15 percent slopes, moderately eroded	2, 840	. 4
Tama silt loam, 10 to 15 percent slopes, severely eroded	520	. 1
Terrace escarpments, medium textured	1, 192	. 2
Terrace escarpments, coarse textured	2, 218	. 3
Toddville silt loam	340	(1)
Total land area	747, 520	[2] 98. 2
Water	10, 240	
Total area	757, 760	

[1] Less than 0.1 percent.

[2] Soils that have an acreage of less than 0.1 percent make up the remaining 1.8 percent of the total land area.

Alluvial Land

Alluvial land is a miscellaneous land type made up of sandy and silty sediments deposited by water. It is nearly level and occurs on the lower parts of flood plains along major streams and drainageways.

Alluvial land (An).—The uppermost part of this land type consists of grayish-brown to dark-brown, friable soil material that is about 8 inches thick. This material has moderate, medium, granular structure, contains many plant roots, and is variable in reaction. Just below is grayish-brown to brown, stratified silt and fine sand that has little or no structure. This underlying material becomes more stratified with depth and is very slightly acid.

The texture in the upper part of the soil material is dominantly silty but ranges from silt loam to sand. The fertility is moderately high. The water table is at the surface or at depths within 5 feet of the surface during most of the growing season; consequently, the moisture-holding capacity is generally high. Internal drainage ranges from slow to very slow. This miscellaneous land type is slightly acid to very slightly acid or very mildly alkaline.

Included with this land type are some areas of Arenzville, Marsh, Orion, and Riverwash that were too small to map separately.

Alluvial land is used mainly for pasture or to grow forage crops. If the areas are large enough to till and are not too poorly drained, moderate yields of corn, small grains, and forage crops are obtained. The areas are likely to be flooded, however, during the growing season. Adding commercial fertilizer or improving drainage by installing tile drains is generally not profitable. Many small areas occur near more productive soils and are used and managed the same as those soils. (Capability unit Vw–1.)

Arenzville Series

The Arenzville series is made up of nearly level, silty, alluvial soils that are moderately well drained to well drained. The soils occur on the higher parts of the flood plains of the larger streams (fig. 7). They have formed in silty materials washed from the loess-covered uplands.

Arenzville silt loam (Ar).—This soil occurs throughout the county along the larger streams. The following describes a profile in the northwest corner of section 22 in Beetown Township:

A 0 to 8 inches, dark-gray silt loam; moderate, medium, granular structure; friable; many grass roots and earthworm casts; pH 7.5.

8 to 15 inches, dark-gray, pale-brown, and brown silt loam; has thin lenses of fine sandy loam that have weak, medium, granular structure; friable; many plant roots; pH 7.5.

15 to 40 inches, pale-brown to dark grayish-brown silt loam; massive; friable; stratified with thin lenses of fine sandy loam; pH 7.0.

40 to 48 inches, dark grayish-brown silt loam; massive; friable; stratified in most places; pH 7.5.

In some places the surface layer of this soil has a darker color than that of typical Arenzville silt loam. The texture of the surface layer in a few areas is fine sandy loam. The soil is slightly acid to neutral throughout the profile. In Grant Valley and in several other places in the county, an older, buried soil occurs at depths of 18 to 42 inches (fig. 8). This buried soil is dark colored.

Figure 7.—**In the foreground, Arenzville silt loam on the flood plain of a small stream; in the background, Fayette silt loam, valleys, on the concave slopes that lead to the wooded areas of Stony rock land, steep. (Photo by F. D. Hole, Soil Survey Division, University of Wisconsin.)**

Arenzville silt loam is high in fertility. Its moisture-holding capacity is also high.

Streambank cutting and occasional flooding limit the use of this soil for crops. Although floodwaters cover the

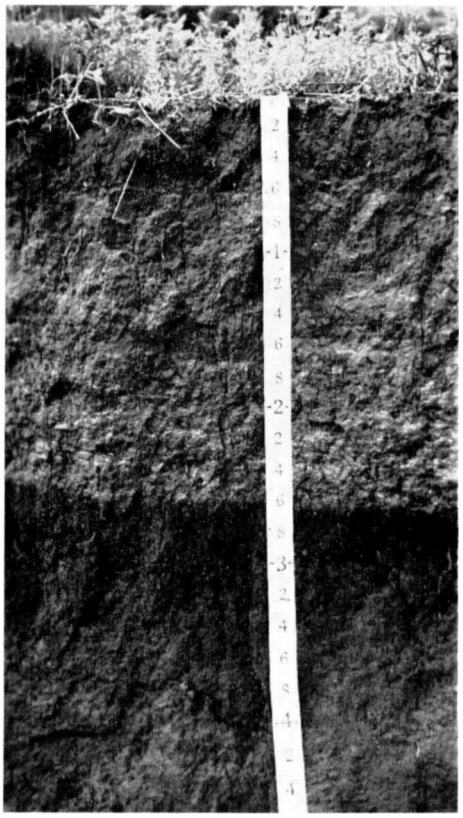

Figure 8.—**Profile of Arenzville silt loam showing light-colored soil material over a darker, buried soil. (Courtesy of F. D. Hole, Soil Survey Division, University of Wisconsin.)**

areas for short periods in spring, the soil is well suited to corn, small grains, hay, and pasture. If floods do not damage the crops, good yields are obtained. Crops respond well to a complete fertilizer. They make even better yields if a supplemental nitrogen fertilizer is added. Lime is generally not needed. (Capability unit IIw–11.)

Atterberry Series

The soils of the Atterberry series are nearly level to sloping and are somewhat poorly drained. They are on the uplands and occur in seepy areas on slopes and along drainageways. These soils have formed under prairie-timber vegetation in silty deposits more than 42 inches thick. They generally overlie Maquoketa shale, which is at depths of 5 to 15 feet.

Most of these soils have slopes of less than 6 percent. In some small areas, however, where the soils occur near soils of the Downs series, the slopes are steeper. Typically, the surface layer consists of black to very dark gray or dark-brown, friable silt loam. The subsoil is dark grayish-brown, firm silty clay loam that generally is mottled with gray and yellowish brown. The substratum, a light olive-brown, massive, friable silt loam, is also highly mottled.

The natural fertility of these soils is high. Permeability is moderately slow, and the moisture-holding capacity is high. The soils are normally very slightly acid.

Atterberry silt loam, 0 to 2 percent slopes (AtA).—This soil generally occurs in fairly small areas in the townships of Hazel Green, Jamestown, and South Lancaster. The following describes a typical profile:

A 0 to 11 inches, black to dark-brown silt loam; moderate, very fine, crumb structure but grades to weak, thick, platy structure with increasing depth; friable; plant roots abundant; pH 7.0.

11 to 13 inches, very dark gray silt loam; a few, fine, faint mottles of dark grayish brown; moderate, thin, platy structure; friable; pH 6.5.

B 13 to 19 inches, very dark grayish-brown to dark grayish-brown silt loam; many, medium, distinct mottles of light brownish gray; moderate, medium, subangular blocky structure; friable; pH 5.8.

19 to 40 inches, grayish-brown silty clay loam that is highly mottled; moderate, medium, angular blocky structure; firm when moist, but slightly plastic when wet; pH 6.5.

C 40 inches +, light olive-brown, heavy silt loam; massive; firm when moist, but slightly plastic when wet; underlain by Maquoketa shale at a depth of 10 feet; pH 7.5.

This soil has only a slight hazard of erosion. It can be used for tilled crops fairly intensively if a suitable cropping system is used and an adequate supply of plant nutrients is maintained. Except for alfalfa, all crops commonly grown in the county make high yields on this soil. If the soil is drained and well managed otherwise, alfalfa also makes high yields.

The main limitation to the use of this soil for crops is excessive wetness. The soil has received some excess water as the result of seepage from higher areas. Water drains slowly through this soil. In spring or during rainy seasons, a perched water table is near the surface in many places. Sometimes, water remains in the drainageways throughout the summer. Artificial drainage is needed, particularly if legumes are to be grown; tile drains can be used to provide drainage. In many places, however, the soils are hard to till even though they have been drained. If legumes are to make high yields, enough lime will be needed to raise the pH of the soil to 6.5 or 7.0. (Capability unit IIw–1.)

Atterberry silt loam, 2 to 6 percent slopes (AtB).—This soil has a thinner surface layer than Atterberry silt loam, 0 to 2 percent slopes. In some places it is moderately eroded, but less than 50 acres is moderately eroded. The present surface layer is 8 to 10 inches thick.

If a suitable cropping system is used, practices are applied to maintain the supply of plant nutrients, and simple practices are applied to control erosion, this soil can be cropped intensively. Subsurface drainage and control of runoff will help to prevent erosion. Crops on this soil respond well to applications of a complete fertilizer and lime. Larger amounts of commercial fertilizer will be required to restore productivity on the moderately eroded areas than will be needed on the uneroded areas; manure should also be added. (Capability unit IIw–1.)

Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded (AwC2).—This mapping unit is made up of small areas of well-drained Downs silt loam surrounded by somewhat poorly drained areas of Atterberry silt loam. The areas are small and are so intermingled that they could not be mapped separately. The Atterberry soils comprise about 60 percent of the acreage. In most of the areas, from ⅓ to ⅔ of the original surface layer has been lost through erosion. A few small areas are only slightly eroded; others are severely eroded.

These soils are hard to manage because of the moderate risk of erosion and excessive wetness. They cannot be cropped intensively unless practices are applied to prevent further erosion. Drainage is needed to help improve the wet areas for crops, particularly for alfalfa, which cannot be established in poorly drained areas. Water-control practices, such as terracing and use of diversion ditches, are needed to help control runoff.

Crops on these soils respond well if a complete fertilizer is added. Apply lime according to the needs indicated by soil tests. To help restore productivity in the severely eroded areas, add large amounts of manure. (Capability unit IIIe–1.)

Bertrand Series

The Bertrand series is made up of deep, silty soils that are well drained. The soils are nearly level to sloping and occur on the terraces of streams. They have formed under timber in yellowish-brown silt that extends to depths of 42 inches or more. The silt was laid down by water. It overlies stratified silt and fine sand.

The surface layer of these soils is grayish-brown or dark grayish-brown, friable silt loam. The subsoil of yellowish-brown silty clay loam is moderately permeable and overlies the substratum of yellowish-brown, friable silt loam.

These soils are moderately high in natural fertility. Permeability is moderate, and the moisture-holding capacity is high. The soils are slightly acid. Slopes range from 0 to 15 percent, but in most areas the soils have slopes of less than 6 percent.

Bertrand silt loam, 0 to 2 percent slopes (BtA).—Most of this soil occurs in fairly small areas throughout the county. One of the larger areas is in Muscoda Township near the place where Fennimore Creek joins the Blue River. The following describes a profile typical of Bertrand silt loam, 0 to 2 percent slopes:

A 0 to 8 inches, dark grayish-brown silt loam; moderate, medium, granular structure; friable; plant roots and earthworm casts abundant; pH 6.7.
8 to 13 inches, very pale brown silt loam; moderate, medium, platy structure; friable; plant roots and earthworm casts abundant; pH 6.0.
B 13 to 32 inches, yellowish-brown, light silty clay loam; moderate, medium, subangular blocky structure; firm; plant roots abundant; pH 6.0.
C 32 inches +, dark yellowish-brown, heavy silt loam; weak, coarse, subangular blocky structure in the upper part, but massive in the lower part; friable; pH 5.8.

This soil is suited to all the crops commonly grown in the county. If a suitable cropping system is used and practices are applied to maintain a good supply of plant nutrients, it can be cropped intensively and yields are high. There is a slight risk of erosion, but no special practices are needed to control erosion. In many places yields are limited by lack of organic matter and nitrogen. Crops respond well to applications of a complete fertilizer. Enough lime should be added to raise the pH to 6.5 or 7.0. (Capability unit I–1.)

Bertrand silt loam, 2 to 6 percent slopes (BtB).—This soil is more likely to erode than Bertrand silt loam, 0 to 2 percent slopes. The use and management of the two soils is similar, but this soil requires special practices to prevent erosion. (Capability unit IIe–1).

Bertrand silt loam, 2 to 6 percent slopes, moderately eroded (BtB2).—This soil has a lighter colored surface layer than Bertrand silt loam, 0 to 2 percent slopes. In most places between ⅓ and ⅔ of the original surface layer has been lost through water erosion. In some places more than two-thirds of the original surface layer is gone. The present surface layer is 6 to 9 inches thick.

Yields of crops on this soil are limited by lack of organic matter and nitrogen. If practices are applied to conserve the soil and if a suitable cropping system is used and a good supply of plant nutrients is maintained, the soil can be used intensively. Crops on this soil respond well if a complete fertilizer and manure are added. Enough lime should be added to raise the pH to 6.5 or 7.0. (Capability unit IIe–1.)

Bertrand silt loam, 6 to 10 percent slopes (BtC).—The surface layer of this soil is slightly lighter in color and is thinner than that of Bertrand silt loam, 0 to 2 percent slopes. In many places thin layers of fine sand occur in the substratum at depths below 3 feet.

This soil needs to be managed carefully to prevent erosion. If it is used for crops, practices will be needed to maintain the supply of plant nutrients. Row crops can be grown less frequently than on the less sloping Bertrand soils. Crops on this soil respond well if a complete fertilizer is added. Turning under green-manure crops and adding barnyard manure will help to increase the content of organic matter and nitrogen. For high yields, add enough lime to raise the pH to 6.5 or 7.0. (Capability unit IIIe–1.)

Bertrand silt loam, 6 to 10 percent slopes, moderately eroded (BtC2).—This soil is similar to Bertrand silt loam, 0 to 2 percent slopes, but it has a thinner, lighter colored surface layer. From ⅓ to ⅔ of the original surface layer has been removed through erosion, and the present surface layer ranges from 5 to 7 inches in thickness. When the soil is plowed, yellowish-brown subsoil is turned up in about half of the area. A few small areas are severely eroded.

This soil can be used and managed about the same as Bertrand silt loam, 6 to 10 percent slopes. It needs even more careful management, however, to prevent further erosion. (Capability unit IIIe–1.)

Bertrand silt loam, 10 to 15 percent slopes, moderately eroded (BtD2).—The surface layer of this soil is pale brown, and, in many places, it is only 4 to 6 inches thick. In many places, at depths of 36 inches or more, the substratum consists of sand interlaid with silt. In some small areas this soil is slightly eroded, and in others it is severely eroded. When the soil is plowed, yellowish-brown subsoil is turned up in about half of the plowed area. The natural supply of plant nutrients is moderately low.

If this soil is cropped intensively, practices will be needed to prevent further erosion. To maintain productivity, choose a cropping system in which soil-conserving crops are grown more of the time than clean-tilled crops. Crops on this soil respond well if a complete fertilizer and manure are added. Enough lime is needed to raise the pH of the soil to 6.5 or 7.0. (Capability unit IIIe–1.)

Chaseburg Series

The Chaseburg soils are well drained to moderately well drained. They occur at the heads of draws, along the bottom lands of small, intermittent streams, and along the foot slopes of the steeper hills. These soils have formed in local alluvium that is 42 inches or more deep. The alluvial materials were washed from light-colored, silty upland soils and from sandstone bedrock.

Most of these soils have slopes of less than 6 percent, but the slopes range from 0 to 15 percent. Typically, the surface layer is dark grayish brown and is friable. The subsoil is yellowish brown and is only weakly developed. The substratum is a brown, friable silt loam. In some places a few stones and boulders occur throughout the profile.

Permeability is moderate, and the moisture-supplying capacity is high. The soils have high natural fertility. They are slightly acid to strongly acid.

Chaseburg silt loam, 0 to 3 percent slopes (ChA).—Most of this soil occurs in small areas that are widely distributed throughout the county. Consequently, its use for agriculture is closely related to that of adjoining soils. The following describes a typical profile:

A 0 to 12 inches, dark grayish-brown silt loam; moderate, medium, granular structure; friable; roots and earthworm casts abundant; pH 6.0.
B 12 to 34 inches, yellowish-brown to light yellowish-brown, heavy silt loam; has a few, medium, distinct mottles of gray and yellowish brown in the lower part of the horizon; weak, medium, subangular blocky structure; friable; pH 5.8.
C 34 inches +, brown silt loam that is slightly mottled with yellowish brown; weak, coarse, subangular blocky structure in the upper part, but becomes massive with increasing depth; friable; pH 5.5.

In most places sandy layers or lenses occur in the solum. In some places the parent material is sandier than that of the typical soil and the surface layer has a loamy texture; these areas were too small to map separately.

This soil is well suited to all the crops commonly grown in the county. If a good supply of plant nutrients is maintained and a suitable cropping system is used, it can be cropped intensively. It responds well to good management. There is a slight risk of erosion, but no special practices are required to protect the soil, except where flooding occurs. Here, dikes should be used to prevent washing by floodwaters. Otherwise, the areas should be kept in pasture or trees.

Crops on this soil respond well if a commercial fertilizer is applied. In most places yields of corn are low because the soil needs nitrogen. In many places lime is needed for high yields of legumes. (Capability unit IIw–11.)

Chaseburg silt loam, 3 to 6 percent slopes (ChB).—This soil has a slightly lighter colored surface layer and stronger slopes than Chaseburg silt loam, 0 to 3 percent slopes. In addition, the hazard of erosion is slight to moderate. Consequently, more careful management is required to prevent erosion. A few small areas have lost more than one-third of their original surface soil. Practices are needed to prevent further damage to the soil from having soil materials washed onto it from higher lying areas.

Crops on Chaseburg silt loam, 3 to 6 percent slopes, respond well if a complete fertilizer is added. Corn, in particular, requires nitrogen. Adding manure, particularly to the moderately eroded areas, will help to restore and to maintain the productivity of this soil. (Capability unit IIw–11.)

Chaseburg silt loam, 6 to 15 percent slopes (ChC).—Most of this soil occurs in narrow draws and near the headwaters of intermittent streams. The hazard of erosion is moderate. Most of this soil has been kept in pasture or is in woodlots. In cultivated areas more than one-third of the original surface layer has been lost.

If cultivated, this soil will need protection from water erosion. In addition, the supply of plant nutrients should be maintained and other good management practices used. (Capability unit IIIe–1.)

Chelsea Series

The Chelsea soils are sandy and excessively drained. They have slopes that are predominantly more than 10 percent. The soils have formed on valley slopes under forest. They are on old, high stream terraces and on old, high dunes near the high terraces. They are mainly in protected coves and along small drainageways near the Wisconsin River between Boscobel and the Blue River. The soils have formed in well-sorted fine sand containing a small amount of dark-colored minerals. In some places the parent material shows crossbedding as the result of deposition by wind.

These soils have a surface layer of dark grayish-brown fine sand. The subsoil is yellowish-brown fine sand and has thin, discontinuous, darker colored bands in the lower part. The bands are redder in color and slightly heavier in texture than the subsoil material of fine sand between the bands. The nature and occurrence of the bands vary markedly horizontally within short distances. Typically, the dark-brown bands are a fraction of an inch thick, have a texture of loamy fine sand, and occur at depths below 4 to 6 feet. In some areas, however, the bands are more strongly expressed, are an inch or more thick, have a texture of fine sandy loam, and occur at depths of less than 4 feet. Locally, in areas where wind has recently deposited new materials or has disturbed the soil, the bands are indistinct or absent to depths of 8 feet.

The natural fertility of these soils is low. Permeability is very rapid, and the moisture-supplying capacity is very low. The soils are medium acid but become less acid with increasing depth.

Chelsea fine sand, 0 to 6 percent slopes, eroded (CsB2).—Most of this soil is on the crests or foot slopes of high terraces or dunes. The following describes a profile of this soil:

A 0 to 9 inches, dark grayish-brown to dark-brown fine sand; weak, fine, granular structure; very friable; many roots; pH 5.9.

9 to 16 inches, dark yellowish-brown fine sand; very weak; medium, subangular blocky structure to single grain; very friable to loose; a few roots; pH 5.6.

C 16 to 26 inches, yellowish-brown to dark yellowish-brown fine sand; single grain; loose; a few roots; pH 5.7.

26 to 48 inches, yellowish-brown to light yellowish-brown fine sand; single grain; loose; a few roots above depths of 36 inches; pH 5.7.

48 to 60 inches, light yellowish-brown fine sand; single grain; loose; in the lower part, a few, very thin, wavy, dark-brown bands of weakly coherent loamy fine sand; pH 5.7.

60 inches +, light yellowish-brown fine sand; single grain; loose; dark-brown, wavy bands are 3 to 6 inches apart and very friable; bands become thicker and closer together with increasing depth and grade from loamy fine sand to fine sandy loam; pH 5.8, but becomes less acid with increasing depth.

The hazard of wind erosion is serious if this soil is cultivated. Most areas are best used for pasture or forest. If the rainfall is adequate and well distributed throughout the growing season, melons, cucumbers, and other special crops will grow well under good management.

Most of this soil is in forest, but some small areas are in pasture or used to grow rye, oats, and hay crops. A small acreage is used to grow melons and cucumbers. If the soil is cultivated, large amounts of manure and a complete fertilizer are required for satisfactory yields. (Capability unit VIIs–1.)

Chelsea fine sand, 6 to 10 percent slopes, eroded (CsC2).—This soil is similar to Chelsea fine sand, 0 to 6 percent slopes, eroded, but it occurs in more undulating areas. Most of it is in pasture or forest. Many of the pastures are moderately eroded. In several small areas the soil is slightly or severely eroded.

Because of the severe hazard of wind erosion, this soil needs a protective cover kept on it most of the time. Care should be taken to protect the pastures from overgrazing. (Capability unit VIIs–1.)

Chelsea fine sand, 10 to 15 percent slopes, eroded (CsD2).—This soil is similar to Chelsea fine sand, 0 to 6 percent slopes, eroded. Where it has recently been affected by wind deposition and disturbance, however, the dark-brown, wavy bands in the subsoil are at greater depths. The soil is better suited to limited grazing and forest than to cultivated crops. Because of the severe hazard of

wind erosion, it needs a protective cover on it most of the time. Pastured areas require protection to prevent further damage from overgrazing. (Capability unit VIIs–1.)

Curran Series

The soils of the Curran series are deep and silty and are somewhat poorly drained. They occur on the terraces of streams near the Bertrand and Jackson soils but in lower lying areas.

Typically, the surface layer of the Curran soils is grayish-brown silt loam. The subsoil is brown silty clay loam that is highly mottled. The substratum is a multicolored silty clay loam. Only one soil of this series, Curran silt loam, is mapped in the county.

Curran silt loam (Cu).—This soil occurs in small areas throughout the county; the acreage is small. The following describes a profile of this soil:

A 0 to 8 inches, dark grayish-brown silt loam; moderate, fine, granular structure; friable; plant roots abundant; pH 6.2.
8 to 15 inches, grayish-brown silt loam; many, medium, distinct mottles of dark brown and dark grayish brown; moderate, very thin, platy structure; friable; plant roots abundant; pH 5.8.
B 15 to 19 inches, grayish-brown, heavy silt loam that is highly mottled; moderate, medium, subangular blocky structure; friable; pH 5.5.
19 to 32 inches, dark grayish-brown to grayish-brown silty clay loam that is highly mottled; moderate, medium to coarse, subangular blocky structure; firm when moist, but slightly plastic when wet; pH 5.5.
C 32 to 42 inches, light brownish-gray, light silty clay loam that is highly mottled; massive; firm when moist, but slightly plastic when wet; pH 5.3.

This soil has slow internal drainage and high moisture-supplying capacity. Natural fertility is moderately high. The soil is slightly acid to strongly acid.

Drainage needs to be improved. Alfalfa, in particular, is hard to establish unless adequate drainage is provided. If the soil is drained and is well managed otherwise, yields of corn, oats, and hay are high. Corn and small grains respond well if nitrogen fertilizer is added, especially if the fertilizer is applied early in spring. In most places lime is needed for high yields of legumes. In some places there is a slight risk of erosion. (Capability unit IIw–1.)

Dakota Series

The Dakota soils are well drained. They occur on stream terraces near soils of the Sparta series. Most areas of these soils are along the Wisconsin River between Boscobel and Muscoda. A few small areas are along the Mississippi River. These soils have formed under prairie in sandy loam material. The underlying material is stratified sand that includes some gravel.

Typically, the surface layer of the Dakota soils is black fine sandy loam, and the subsoil is brown fine sandy loam. The substratum is sandy and lies at depths between 24 and 38 inches.

These soils have moderate to moderately rapid permeability, and the moisture-supplying capacity is moderately low. They have moderate natural fertility. The soils are strongly acid to neutral.

Dakota fine sandy loam, 0 to 2 percent slopes (DaA).—Generally, this soil occurs between areas of Sparta soils. It is on terraces near the rivers and on valley slopes. The following describes a typical profile:

A 0 to 8 inches, black to very dark gray fine sandy loam; weak, fine, granular structure; very friable; plant roots abundant; pH 6.8.
8 to 14 inches, very dark gray to dark gray, light fine sandy loam; weak, fine, granular structure; very friable; plant roots abundant; pH 5.8.
B 14 to 26 inches, dark grayish-brown fine sandy loam; weak, medium, subangular blocky structure; very friable; plant roots plentiful; pH 5.3.
26 to 32 inches, yellowish-brown loamy fine sand; slightly compact in place; single grain; very friable; plant roots plentiful; pH 5.5.
C 32 inches +, light yellowish-brown fine sand; single grain; loose; in many places there are thin lenses, or layers, of reddish-brown fine sandy loam or sandy clay loam; pH 6.0.

This soil is well suited to all the crops commonly grown in the county. If a suitable cropping system is used and the supply of plant nutrients and organic material is maintained, it can be cropped intensively. There is a slight risk of wind erosion. No special practices are needed to prevent erosion by wind if the soil is otherwise well managed. Yields are generally high. During dry periods, however, lack of moisture causes crops to make lower yields in many places. Applying practices to conserve moisture will help to maintain yields.

Crops on this soil respond well if lime and fertilizer are added. The lime and fertilizer should be applied according to needs indicated by soil tests. Nitrogen fertilizer is required for corn and nonleguminous hay crops, but generally it is not needed for small grains. (Capability unit IIIs–2.)

Dakota fine sandy loam, 2 to 6 percent slopes (DaB).—The risk of erosion is greater on this soil than on Dakota fine sandy loam, 0 to 2 percent slopes. This soil requires careful management to prevent losing part of the surface soil. In a few small areas, the soil has lost more than one-third of the original surface layer.

If fairly simple practices are used to prevent erosion and if a suitable cropping system is used and practices are applied to maintain a good supply of plant nutrients, this soil can be cropped intensively. Crops respond well if fertilizer and lime are added. The fertilizer and lime should be applied according to the needs indicated by soil tests. Also, manure, added to the eroded areas, will help to restore the productivity of the soil. (Capability unit IIIs–2.)

Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded (DaC2).—Most of this soil occurs in narrow bands on the breaks between terrace levels. The acreage is small. Except for erosion, the profile is similar to that of Dakota fine sandy loam, 0 to 2 percent slopes. In most places more than one-third of the original surface layer has been lost, but there are small areas of less eroded soil. There is a moderate risk of further erosion.

This soil should not be cultivated intensively. Practices are needed to prevent further erosion and to maintain a good supply of plant nutrients. To help maintain productivity, use a cropping system in which grasses and legumes are grown more of the time than clean-tilled crops. (Capability unit IVs–2.)

Dodgeville Series

The soils of the Dodgeville series are well drained. They occur on upland ridges above the slopes of stream valleys. Near them are soils of the Downs and Tama series. The Dodgeville soils have formed under prairie in a blanket of windblown silt, or loess. The loess overlies reddish residual clay. Below the clay is limestone bedrock.

These soils have been mapped in two phases, depending upon the thickness of the silt cap over the underlying red clay. Generally, the surface layer is dark-colored silt loam. In most places the subsoil is brown silty clay loam and the substratum is reddish-brown clay. The thickness of the clay ranges from 8 to 42 inches, varying considerably within short distances. The slope ranges from 2 to 30 percent.

In the shallow soils the thickness of the silt ranges from 12 to 18 inches. The subsoil has formed mainly in residual clay and is thinner, redder, and finer textured than that of the deep soil. Also, depth to limestone bedrock is less. In the deep soils, on the other hand, most of the subsoil has formed in silt.

The Dodgeville soils have medium internal drainage and moderate to high moisture-holding capacity. They are moderately high in natural fertility and are slightly acid to medium acid.

Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded (DbC2).—Most of this soil is moderately eroded, but a few areas are only slightly eroded. The following describes a typical profile:

A 0 to 8 inches, black to very dark gray silt loam; moderate, medium, crumb structure; friable; many earthworm casts; plant roots abundant; a few fragments of chert; pH 6.0.
8 to 12 inches, very dark grayish-brown silt loam; moderate, medium, crumb structure; many earthworm casts; plant roots abundant; a few fragments of chert; pH 5.8.
B 12 to 26 inches, reddish-brown silty clay loam; moderate to strong, medium, subangular blocky structure; firm when moist, but slightly plastic when wet; plant roots plentiful, pH 6.0.
C 26 inches +, reddish-brown silty clay, massive; hard when dry, but plastic when wet; many angular fragments of cherty limestone; grades to limestone bedrock at depths of 40 inches; pH 6.4.

This soil is moderate in moisture-supplying capacity. The penetration of plant roots is somewhat limited by the residual clay that makes the soil somewhat droughty.

All the crops commonly grown in the county can be grown on this soil. If the soil is cultivated, practices are needed to prevent further erosion by water. In addition, adequate supplies of plant nutrients and organic matter should be maintained. Yields of crops are generally high if the soil is well managed. During extended dry periods, however, yields of corn and second cuttings of hay are reduced. Early maturing crops are the best to plant. (Capability unit IIIe–2.)

Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded (DbD2).—This soil has a slightly thinner surface layer than Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded. The present surface layer is 8 to 10 inches thick. A few areas in pasture or trees are less eroded than the rest of this soil. In most of the soil, the risk of erosion is moderate to severe.

This soil requires a suitable cropping system and supporting practices to prevent further erosion. Crops respond well if a complete fertilizer and manure are added. (Capability unit IIIe–2.)

Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded (DbE2).—The surface layer of this soil is slightly lighter colored and thinner than that of Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded. The subsoil is also thinner, and residual clay occurs at depths of 2 feet or less.

This soil has a severe hazard of erosion. The moisture-holding capacity is moderate to low; in many places the soil is droughty.

This soil has a limited use for crops. The crops respond well if a complete fertilizer is added. If adequate amounts of fertilizer are applied, high yields of hay and pasture are obtained. To keep the soil productive, choose a cropping system in which soil-conserving crops are grown more of the time than clean-tilled crops. In addition, use practices to maintain a good supply of plant nutrients and to control erosion. (Capability unit IVe–2.)

Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded (DbF2).—This soil has a thinner surface layer and a thinner subsoil than Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded. Also, it has a lower moisture-holding capacity and is more droughty. In many places the present surface layer is 5 to 8 inches thick. The subsoil generally is less than 1 foot thick.

Because of the strong slopes and resulting severe hazard of erosion, this soil is best kept in grasses and legumes. If necessary, it can be cultivated occasionally before reseeding. Applications of a complete fertilizer are needed. (Capability unit VIe–1.)

Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded (DcB2).—This soil occupies large areas on the broader ridgetops in the eastern part of the county. It also occurs near breaks to the steeper areas in the western part. The following describes a typical profile:

A 0 to 8 inches, black silt loam; moderate, medium, granular structure; friable; plant roots and earthworm casts abundant; pH 6.2.
8 to 12 inches, very dark grayish-brown silt loam; weak, coarse, subangular blocks that break to moderate, medium granules; friable; plant roots plentiful; much earthworm activity; pH 6.0.
B 12 to 18 inches, dark yellowish-brown, light silty clay loam; moderate, medium, subangular blocky structure; firm; plant roots plentiful; much earthworm activity; a few clay skins on peds; pH 5.8.
18 to 32 inches, reddish-brown silty clay loam grading to silty clay at depths below 28 inches; moderate to strong, medium, subangular blocky structure; firm; slightly hard when dry, and slightly plastic when wet; prominent clay skins on peds; a few chert fragments at depths below 28 inches; roots plentiful to depths of 28 inches, but few below; pH 5.8.
C 32 inches +, reddish-brown clay; strong, medium, angular blocky structure; hard when dry, but plastic when wet; a few plant roots; many fragments of chert scattered throughout; limestone bedrock is at a depth of 44 inches in this profile; pH 6.5.

This soil has a moderate hazard of erosion. In many places more than one-third of the original surface soil has been lost through erosion. In a few small areas, the soil is only slightly eroded.

Good tilth is easy to maintain in this soil. If good management is used, the soil can be cropped intensively. It is suited to all of the crops commonly grown in the county. Yields are high if an adequate supply of plant nutrients is maintained. The crops respond well if a complete fertilizer is added. Using practices to control erosion will help prevent additional soil from being lost and a corresponding lowering of yields. (Capability unit IIe–1.)

Dodgeville silt loam, deep, 6 to 10 percent slopes (DcC).—This soil has stronger slopes and a slightly thinner surface layer than Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded. The surface layer is 8 to 10 inches thick.

This soil is suited to all of the crops commonly grown in the county, but it is likely to erode. Consequently, if cultivated crops are grown, practices will be needed to prevent erosion. A suitable cropping system should be used and an adequate supply of plant nutrients maintained. The resulting yields will be high. (Capability unit IIIe–1.)

Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded (DcC2).—This soil is similar to Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded, but it has a slightly thinner surface layer. From ⅓ to ⅔ of the original surface layer has been lost through water erosion.

The soil is suited to all the crops commonly grown in the county. If a suitable cropping system is used and if practices are applied to prevent further erosion and to maintain an adequate supply of plant nutrients, yields will be high. Crops on this soil respond well if a complete fertilizer and manure are added. (Capability unit IIIe–1.)

Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded (DcD2).—This soil has a thinner, slightly lighter colored surface layer than Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded. In most places it has lost more than one-third of the original surface layer; in a few small areas less than one-third of the surface soil is gone. The present surface layer is about 8 inches thick.

This soil is likely to erode and should not be cropped intensively. To help keep it productive, use a suitable cropping system, maintain an adequate supply of plant nutrients, and apply practices to prevent further erosion. (Capability unit IIIe–1.)

Dodgeville silt loam, deep, 15 to 20 percent slopes (DcE).—The surface layer of this soil is 5 to 8 inches thick and is slightly lighter in color than that of Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded. The acreage of this soil is small. Most of it is in pasture.

This soil is likely to erode. If feasible, close-growing crops, such as hay or pasture, should be kept on the soil. Crops respond well if a complete fertilizer is added. The pastures benefit from additional nitrogen. (Capability unit IVe–1.)

Dodgeville soils, 6 to 10 percent slopes, severely eroded (DdC3).—These soils are similar to Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded, but they are more erodible. More than two-thirds of the original surface soil has been lost through erosion. When the soils are plowed, part of the subsoil is mixed with the remaining surface layer, giving the surface layer a browner color than normal.

Tilth is harder to maintain in these soils than in Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded, and more careful management is required to prevent further erosion. Furthermore, these soils are slightly droughtier because bedrock is at shallower depths. A suitable cropping system and adequate supporting practices are required to prevent further erosion. In addition, large amounts of commercial fertilizer and manure are needed to help maintain the content of organic matter and the supply of plant nutrients. (Capability unit IVe–2.)

Dodgeville soils, 10 to 15 percent slopes, severely eroded (DdD3).—These soils have a thinner surface layer than Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded. The original surface layer was 8 to 10 inches thick, but more than two-thirds of it has been lost through erosion. In some places the subsoil has been mixed with the remaining surface layer, and the present surface layer has a browner color than the original one.

Good tilth is harder to maintain in these soils than in Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded, and more careful management is required to prevent further erosion. A cropping system is needed in which grasses and legumes are grown more of the time than clean-tilled crops, and supporting practices should be used that will prevent further erosion. In addition, applying large amounts of a complete fertilizer and manure will help to restore the soils to their former high productivity. (Capability unit IVe–2.)

Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded (DeB3).—These soils have a thinner surface layer than Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded. From two-thirds to nearly all of the original surface layer has been lost through erosion. In some places plowing has mixed part of the finer textured subsoil with the remaining surface soil.

Tilth is harder to maintain in these soils than in Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded. Practices are needed to prevent further erosion. Adding large amounts of a commercial fertilizer and manure will help to maintain the supply of plant nutrients and to make the soils more productive. (Capability unit IIIe–1.)

Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded (DeC3).—These soils have lost more than two-thirds of the original surface layer through water erosion. Plowing has mixed part of the subsoil with the remaining surface soil. As a result, the present surface layer has a browner color than the original one.

These soils are not suited to intensive cropping. They should be kept under a cover of grasses and legumes or under other close-growing crops as much of the time as feasible. Also, if feasible, apply supporting practices to prevent further erosion. Crops on these soils respond well if a complete fertilizer and manure are added. (Capability unit IVe–1.)

Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded (DeD3).—These soils have lost more than two-thirds of their original surface layer through erosion. In most places plowing has mixed part of the subsoil with

the remaining surface soil and the present surface soil has a brownish color.

Good tilth is hard to maintain. The hazard of erosion is severe. The soils are not suited to intensive cropping. Nevertheless, if a good supply of plant nutrients is maintained and supporting practices are applied to prevent further erosion, they will have limited use for crops. The tilth and content of organic matter can be improved by adding large amounts of manure. (Capability unit IVe–1.)

Downs Series

The Downs soils are deep and silty and are well drained. They occur on rolling ridges throughout the county but are the most extensive in the central part. The slopes range from 2 to 15 percent. Most of the soils, however, have slopes of less than 8 percent. The soils have formed under both forest and prairie vegetation in a thick blanket of windblown silt, or loess.

Typically, the surface layer of the Downs soils is dark-gray or very dark brown silt loam. The subsoil is dark-brown, friable silty clay loam, and the substratum is yellowish-brown, friable silty material. Sandstone or limestone bedrock generally occurs at depths of more than 42 inches.

The Downs soils are moderately permeable and have a moderately high moisture-supplying capacity. Their natural fertility is moderately high. The soils are generally medium acid to strongly acid. The hazard of erosion ranges from slight on the gently sloping soils to severe on the strongly sloping ones.

Downs silt loam, 2 to 6 percent slopes, moderately eroded (DoB2).—More than two-thirds of the acreage of Downs soils mapped in the county is in this mapping unit. The following describes a typical profile in a field that has been limed:

A 0 to 9 inches, very dark brown to dark-gray silt loam; moderate, fine, granular structure; friable; plant roots abundant; pH 7.0.
9 to 14 inches, brown silt loam; moderate, medium, platy structure, friable; plant roots plentiful; pH 7.0.
B 14 to 18 inches, dark-brown silt loam; moderate, fine, subangular blocky structure; friable; plant roots plentiful; moderately vesicular with light brownish-gray silica coatings on peds; pH 6.0.
18 to 34 inches, dark yellowish-brown silty clay loam; moderate, medium, angular to subangular blocky structure; firm; plant roots plentiful; grayish silica coatings on peds; pH 5.6.
34 to 40 inches, dark yellowish-brown, light silty clay loam; weak, medium, subangular blocky structure; friable; a few plant roots; grayish silica coating on peds; pH 5.5.
C 40 inches +, dark yellowish-brown silt loam; massive; friable; pH 5.8.

In most of this soil, more than one-third of the original surface layer has been lost through erosion. Nevertheless, if a good supply of plant nutrients is maintained and practices are applied to prevent further erosion, the soil can be cropped fairly intensively. All the crops commonly grown in the county can be grown. Crops on this soil respond well if a complete fertilizer and manure are added. In some places, however, yields are limited by lack of organic matter and nitrogen. If the soil has not been limed, add enough lime to raise the pH to 6.5 or 7.0. (Capability unit IIe–1.)

Downs silt loam, 2 to 6 percent slopes, severely eroded (DoB3).—This soil is similar to Downs silt loam, 2 to 6 percent slopes, moderately eroded, but it has lost more than two-thirds of the original surface layer through erosion.

If this soil is well managed, much of the former high productivity can be restored. It should not be cropped intensively unless practices have been applied to prevent further erosion. A suitable cropping system is necessary. In addition, large amounts of a complete fertilizer and manure are required. Apply lime according to the needs indicated by soil tests. (Capability unit IIIe–1.)

Downs silt loam, 6 to 10 percent slopes (DoC).—This soil is less eroded than Downs silt loam, 2 to 6 percent slopes, moderately eroded, and it has a slightly thinner surface layer. Most of it has been kept in permanent pasture or in woodlots; consequently, it has not been exposed to erosion. The hazard of erosion in cultivated areas, however, is moderate.

If well managed, this soil can be used for crops. A suitable cropping system is needed, and supporting practices should be used to prevent erosion. In addition, an adequate supply of plant nutrients must be maintained. Crops on this soil respond well if a complete fertilizer is added. Nonleguminous pasture and hay crops respond well if additional nitrogen is applied. (Capability unit IIIe–1.)

Downs silt loam, 6 to 10 percent slopes, moderately eroded (DoC2).—This soil has a slightly thinner surface layer than Downs silt loam, 2 to 6 percent slopes, moderately eroded. More than one-third of the original surface layer has been lost through water erosion. A few small areas are severely eroded. The present surface layer is 9 to 12 inches thick.

This soil should not be cropped intensively, even under good management. A suitable cropping system is required, and practices are needed to prevent further erosion. Also, the supply of plant nutrients should be kept high. Crops on this soil respond well if a complete fertilizer and manure are added. In many places yields of corn and nonleguminous hay crops are limited by lack of nitrogen. Apply lime according to the needs indicated by soil tests. (Capability unit IIIe–1.)

Downs silt loam, 10 to 15 percent slopes, moderately eroded (DoD2).—The surface layer of this soil is thinner and slightly lighter in color than that of Downs silt loam, 2 to 6 percent slopes, moderately eroded. Also, this soil is more likely to erode. The present surface layer is about 8 to 10 inches thick.

Yields are high if this soil is well managed, but the soil should not be cropped intensively. A cropping system is needed in which grasses and legumes are grown more of the time than clean-tilled crops. In addition, practices should be applied to prevent further erosion. To help increase yields, apply a complete fertilizer and manure. (Capability unit IIIe–1.)

Downs silt loam, 10 to 15 percent slopes, severely eroded (DoD3).—More than two-thirds of the original surface layer of this soil has been lost through erosion. In

some places nearly all of the original surface layer is gone.

Intensive practices are needed to prevent further erosion. Other good management will be required to restore the soil to its former high productivity. Large amounts of a complete fertilizer and manure are also needed, and a cropping system should be used in which grasses and legumes are grown more of the time than clean-tilled crops. (Capability unit IVe–1.)

Dubuque Series

The soils of the Dubuque series are silty and are well drained. They occur on rolling upland ridges and have slopes ranging from 2 to more than 45 percent.

These soils have formed in a blanket of silt and in reddish, residual clay that is at depths between 8 and 42 inches. The depth of the silt varies, but it is generally deeper in the southwestern part of the county and thinner toward the northeast. The thickness of the residual clay over the limestone bedrock also varies. In most places the clay has fragments of chert throughout; in many places it has a cherty horizon in the upper part. Typically, Dubuque soils have a grayish-brown or dark grayish-brown surface layer. The subsoil is brown or yellowish-brown silty clay loam, and the substratum is reddish, gritty clay.

The natural fertility of these soils is moderately low to moderately high. Permeability is moderate, and the moisture-supplying capacity is low to high. The soils are medium acid to strongly acid.

Two profiles are described for this series. The first is that of a Dubuque silt loam; the other is that of a Dubuque silt loam, deep. Areas of Dubuque silt loam that have many stones on the surface and throughout the profile have been mapped as Dubuque stony silt loam.

Dubuque silt loam, 2 to 6 percent slopes (DsB).—This soil has formed in silt that is 12 to 18 inches thick over residual clay. The subsoil has formed mainly in the clay. The following describes a typical profile:

A 0 to 7 inches, dark grayish-brown silt loam; moderate, medium, granular structure; friable; roots abundant; pH 6.0.
7 to 12 inches, grayish-brown silt loam; moderate, medium, platy structure; friable; roots plentiful; pH 5.5.
B 12 to 16 inches, yellowish-brown silty clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; pH 5.5.
16 to 30 inches, reddish-brown silty clay; strong, fine, angular blocky structure; hard when dry, but plastic when wet; a few roots; pH 5.8.
C 30 to 42 inches, yellowish-red clay; massive; hard when dry, but plastic when wet; pH 6.0; whitish, hard dolomitic limestone at a depth of 42 inches.

The moisture-supplying capacity of this soil is moderate. Roots cannot penetrate the residual clay easily, and, therefore, much of the moisture held by the clay is not available to plants. During extended dry periods the soil is somewhat droughty. The hazard of erosion is slight.

If practices are used to prevent erosion, this soil can be cropped fairly intensively. It is suited to all of the crops commonly grown in the county. The soil is only moderately deep over bedrock; consequently, it is not generally suited to terracing. If feasible, however, stripcropping can be used to help prevent erosion. The soil is fairly easy to till and can be managed easily.

Corn, small grains, and forage crops grow well on this soil. Yields of corn and second cuttings of hay, however, are sometimes reduced by lack of moisture. The crops respond well if a complete fertilizer is added. In addition, corn and oats make good response if supplemental nitrogen is applied. Legumes require lime for high yields. The lime should be applied according to the needs indicated by soil tests. (Capability unit IIe–2.)

Dubuque silt loam, 2 to 6 percent slopes, moderately eroded (DsB2).—This soil has a thinner surface layer than Dubuque silt loam, 2 to 6 percent slopes. As a result, its content of organic matter and its moisture-supplying capacity are lower. From ⅓ to ⅔ of the original surface layer has been lost through water erosion.

This soil can be used and managed about the same as Dubuque silt loam, 2 to 6 percent slopes. More careful management is needed, however, to prevent further erosion and lowering of the moisture-holding capacity. (Capability unit IIe–2.)

Dubuque silt loam, 6 to 10 percent slopes (DsC).—The surface layer of this soil has a slightly lighter color and is thinner than that of Dubuque silt loam, 2 to 6 percent slopes. Fertility is slightly lower. The hazard of erosion is moderate.

This soil cannot be cropped so intensively as Dubuque silt loam, 2 to 6 percent slopes. Practices are needed to prevent erosion. The soil is too shallow for terracing, but stripcropping and other practices can be used to protect it.

Even though crops are sometimes damaged during periods of drought, corn, oats, hay, and pasture make good yields if the soil is well managed. The crops respond well if a complete fertilizer is added. Adding organic matter and manure will help to increase the water-holding capacity. (Capability unit IIIe–2.)

Dubuque silt loam, 6 to 10 percent slopes, moderately eroded (DsC2).—This soil has lost from ⅓ to ⅔ of the original surface layer through erosion. It is otherwise similar to Dubuque silt loam, 6 to 10 percent slopes, and can be used and managed about the same. More careful management is required, however, to prevent further erosion. In addition, large amounts of a complete fertilizer and manure are needed. (Capability unit IIIe–2.)

Dubuque silt loam, 10 to 15 percent slopes (DsD).—This soil is similar to Dubuque silt loam, 2 to 6 percent slopes, but it has stronger slopes and contains less organic matter and plant nutrients. The hazard of erosion is severe.

If this soil is cropped, a cropping system in which grasses and legumes are grown at least 2 out of 4 years is the best to use. Stripcropping and other supporting practices are needed to help prevent erosion. Crops on this soil respond well if a complete fertilizer is added. Corn, oats, and meadow crops make higher yields if supplementary nitrogen is applied. (Capability unit IIIe–2.)

Dubuque silt loam, 10 to 15 percent slopes, moderately eroded (DsD2).—This soil has lost from ⅓ to ⅔ of the original surface layer through erosion. It is droughtier and lower in organic matter and plant nutrients than Dubuque silt loam, 10 to 15 percent slopes, but it can be used and managed about the same. More careful man-

agement is required, however, to prevent further erosion, and larger amounts of fertilizer and manure are needed. (Capability unit IIIe–2.)

Dubuque silt loam, 15 to 20 percent slopes (DsE).—This soil is similar to Dubuque silt loam, 2 to 6 percent slopes, but it has stronger slopes and is moderately low in plant nutrients. It is also low in moisture-supplying capacity. The hazard of erosion is severe.

This soil has a limited use for crops. It is best suited to pasture and hay. If it is cropped, practices will be needed to prevent erosion. In addition, use a cropping system in which row crops are grown more of the time than clean-tilled crops and maintain a good supply of plant nutrients. (Capability unit IVe–2.)

Dubuque silt loam, 15 to 20 percent slopes, moderately eroded (DsE2).—From ⅓ to nearly ⅔ of the surface layer of this soil has been lost through erosion. As a result, this soil has a lower moisture-supplying capacity than Dubuque silt loam, 15 to 20 percent slopes, and is lower in plant nutrients and organic matter. Otherwise, the two soils are similar, and they can be used and managed about the same. This soil needs larger amounts of a complete fertilizer and manure, however, and more careful management to prevent further erosion. (Capability unit IVe–2.)

Dubuque silt loam, 20 to 30 percent slopes (DsF).—Strong slopes and a severe risk of erosion make this soil hard to till. Consequently, the soil is not suited to crops. It is best kept in pasture or trees.

If this soil is pastured, the pastures need to be renovated. Areas that are planted to trees or that are kept in forest require selective cutting for optimum yields. They also need protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Dubuque silt loam, 20 to 30 percent slopes, moderately eroded (DsF2).—This soil has lost more than one-third of its original surface layer through erosion. As a result, it has a slightly thinner solum than Dubuque silt loam, 20 to 30 percent slopes, is lower in fertility, and has a lower moisture-holding capacity. The two soils are otherwise similar and can be used and managed about the same. This soil, however, requires more careful use of practices to prevent erosion. Also, larger amounts of a complete fertilizer and manure are needed for satisfactory yields of pasture plants. (Capability unit VIe–1.)

Dubuque silt loam, 30 to 45 percent slopes (DsG).—This soil has a thinner, lighter colored surface layer than Dubuque silt loam, 2 to 6 percent slopes, and depth to bedrock is shallower. The present surface layer is 5 to 8 inches thick. Limestone or shattered bedrock generally occurs at depths between 24 and 36 inches.

Surface runoff is very rapid on this soil. Fertility is moderately low, and the moisture-holding capacity is low. The hazard of erosion is severe. The soil is best suited to trees. (Capability unit VIIe–1.)

Dubuque silt loam, deep, 2 to 6 percent slopes (DtB).—This soil has formed in a layer of silt, 18 to 42 inches thick, that lies over residual clay. It occurs on the broader ridgetops near soils of the Fayette series. Its subsoil, unlike that of the Dubuque silt loams just described, has formed mainly in silt rather than in clay. Both the A and B horizons are thicker than those of Dubuque silt loam. The following describes a typical profile of Dubuque silt loam, deep:

A 0 to 5 inches, very dark grayish-brown silt loam; moderate, medium, granular structure; friable; roots abundant; pH 5.8.
5 to 16 inches, brown silt loam; moderate, medium, platy structure; friable; plant roots abundant; pH 5.3.
B 16 to 21 inches, brown, heavy silt loam; moderate, fine to medium, subangular blocky structure; friable; plant roots plentiful; pH 5.8.
21 to 34 inches, dark-brown silty clay loam that grades to reddish-brown, gritty silty clay with increasing depth; moderate, medium, subangular blocky structure that grades to angular blocky structure with increasing depth; hard when dry, but plastic when wet; a few plant roots; clay skins or coatings on the faces of peds; pH 5.8.
C 34 inches +, reddish-brown to yellowish-red, gritty clay; moderate, fine, angular blocky structure; hard when dry, but plastic when wet; contains many angular fragments of chert; grades to limestone bedrock at depths below 5 feet; pH 6.0.

This soil has a slight hazard of erosion, and care is needed to protect it. Good tilth is easy to maintain. If well managed, the soil can be cropped intensively. It is well suited to all the crops commonly grown in the county. Yields are high if an adequate supply of plant nutrients is maintained, but corn requires additional nitrogen and manure. For high yields of legumes, add enough lime to raise the pH to 6.5 or 7.0. (Capability unit IIe–1.)

Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded (DtB2).—This soil is eroded, but it is otherwise similar to Dubuque silt loam, deep, 2 to 6 percent slopes. From ⅓ to ⅔ of the original surface layer is gone. Care is needed to prevent further losses of soil and a corresponding lowering of moisture-storing capacity.

If well managed, this soil can be cropped intensively. A suitable cropping system is required, an adequate supply of plant nutrients must be maintained, and practices will be needed to prevent erosion. Crops on this soil respond well if a complete fertilizer is added. Adding manure will help to maintain the content of nitrogen and organic matter. It will also help to maintain good tilth. (Capability unit IIe–1.)

Dubuque silt loam, deep, 6 to 10 percent slopes (DtC).—This soil has a slightly thinner, lighter colored surface layer than Dubuque silt loam,, deep, 2 to 6 percent slopes. The hazard of erosion is moderate.

If practices are used to prevent erosion and the supply of plant nutrients is kept fairly high, crops will yield well. (Capability unit IIIe–1.)

Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded (DtC2).—The surface layer of this soil is thinner and lighter colored than that of Dubuque silt loam, deep, 2 to 6 percent slopes, and it contains less organic matter. From ⅓ to ⅔ of the original surface layer has been removed through water erosion.

This soil needs care to prevent further losses of soil and corresponding losses of plant nutrients and lowering of moisture-storing capacity. A cropping system is required in which legumes and grasses are grown more of the time than clean-tilled crops. In addition, an adequate supply of plant nutrients should be maintained and practices applied to prevent further erosion. Crops on this soil respond well if a complete fertilizer is added. In

many places, however, yields of corn and oats are low because more nitrogen is needed. Lime is generally required if legumes are to be established. (Capability unit IIIe–1.)

Dubuque silt loam, deep, 10 to 15 percent slopes (DtD).—This soil has stronger slopes than Dubuque silt loam, deep, 2 to 6 percent slopes, and a thinner, lighter colored surface layer. The present surface layer is 8 to 12 inches thick. The risk of erosion is severe, and the soil is slightly droughty.

If cultivated, this soil requires care to prevent serious damage by erosion. A cropping system is needed in which close-growing crops are grown more of the time than clean-tilled crops. In addition, practices should be applied to prevent erosion and to maintain an adequate supply of plant nutrients. Crops on this soil respond well if a complete fertilizer and manure are added. Lime is needed for high yields of legumes. (Capability unit IIIe–1.)

Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded (DtD2).—This soil has lost from ⅓ to nearly ⅔ of the original surface layer through erosion. Otherwise, it is similar to Dubuque silt loam, deep, 10 to 15 percent slopes. The two soils can be used and managed about the same. (Capability unit IIIe–1.)

Dubuque silt loam, deep, 15 to 20 percent slopes (DtE).—The surface layer of this soil is thinner and lighter colored than that of Dubuque silt loam, deep, 2 to 6 percent slopes. It is generally 8 to 10 inches thick. Residual clay is at shallower depths; in most places it is at depths between 18 and 30 inches.

If cultivated, this soil is likely to erode. It can be used to a limited extent for cultivated crops, but good management is required to keep it productive. A cropping system is needed in which close-growing crops are grown more of the time than clean-tilled crops. In addition, practices must be applied to prevent erosion and to maintain the supply of plant nutrients. Crops respond well if a complete fertilizer and manure are applied. If adequate amounts of fertilizer are added, pasture and hay crops make fairly high yields. (Capability unit IVe–1.)

Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded (DtE2).—From ⅓ to ⅔ of the original surface layer of this soil has been lost through erosion. Consequently, the surface layer of this soil is thinner than that of Dubuque silt loam, deep, 15 to 20 percent slopes. Otherwise, the two soils are similar.

This soil requires careful management to prevent further erosion. A suitable cropping system is needed. In addition, practices are required to control erosion and to maintain an adequate supply of plant nutrients. (Capability unit IVe–1.)

Dubuque silt loam, deep, 20 to 30 percent slopes (DtF).—The surface layer of this soil is generally 6 to 8 inches thick and is lighter colored than that of less sloping, deep Dubuque silt loams. The subsoil ranges from 12 to 15 inches in thickness. In most places residual clay is at depths between 18 and 24 inches. The soil has a severe hazard of erosion.

This soil is not suited to crops and is best kept in pasture or in trees. If it is pastured, the pastures need to be renovated. They respond well if a complete fertilizer is added and if it is later supplemented by a nitrogen fertilizer. Forested areas need protection from fire and from grazing by livestock. The more desirable kinds of trees should be encouraged. (Capability unit VIe–1.)

Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded (DtF2).—This soil is more eroded than Dubuque silt loam, deep, 20 to 30 percent slopes, but the two soils are otherwise similar and can be used and managed about the same. This soil requires more care in preparing the seedbed, to prevent further damage from erosion. (Capability unit VIe–1.)

Dubuque silt loam, deep, 30 to 45 percent slopes (DtG).—This soil is steeper than Dubuque silt loam, deep, 20 to 30 percent slopes, but is otherwise similar. Strong slopes and a severe hazard of erosion make it better suited to limited grazing or to trees than to tilled crops. If the soil is used for pastures, the pastures will need to be renovated, but renovating practices are hard to apply. Yields of pastures can be increased by controlling grazing and adding nitrogen fertilizer.

Much of this soil is now in trees. The trees need protection from fire and from grazing by livestock. The more desirable kinds of trees should be encouraged. (Capability unit VIIe–1.)

Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded (DtG2).—This soil is best kept in grass or trees. If cultivated, it erodes easily. The soil can be used and managed about the same as Dubuque silt loam, deep, 30 to 45 percent slopes, but establishing desirable kinds of trees on it is more difficult. (Capability unit VIIe–1.)

Dubuque soils, 6 to 10 percent slopes, severely eroded (DuC3).—The soils in this mapping unit have a thinner, lighter colored surface layer than Dubuque silt loam, 2 to 6 percent slopes, and the surface layer is finer textured. Consequently, the supply of organic matter is lower and the soils are lower in fertility. More than two-thirds of the original surface layer has been lost through erosion.

In these soils clayey material from the subsoil has been mixed with the remaining surface soil by plowing. As a result, good tilth is difficult to maintain. In many places the soils are hard to cultivate. They need to be kept in grass or legumes at least 2 out of 4 years. Large amounts of fertilizer are required to make them more productive. Special care will be needed to prevent further losses of soil. (Capability unit IVe–2.)

Dubuque soils, 10 to 15 percent slopes, severely eroded (DuD3)—Erosion has caused these soils to lose more than two-thirds of their original surface layer. Consequently, the surface layer is thinner and finer textured than that of Dubuque silt loam, 2 to 6 percent slopes. The supply of organic matter is also lower, and the soils are lower in fertility.

These soils are not suited to crops. If lime, fertilizer, and manure are added, they can be seeded to grasses and legumes or planted to trees. In areas that are pastured, grazing should be controlled. In forested areas the trees will require protection from fire and from grazing by livestock. (Capability unit IVe–2.)

Dubuque soils, 15 to 20 percent slopes, severely eroded (DuE3).—These soils have lost nearly all of the original surface soil through erosion. In places part of

the finer textured subsoil has been mixed with the remaining surface soil by plowing. As a result, the texture of the present surface soil is silty clay loam. In some small areas the reddish, clayey substratum is exposed.

Mapped with these soils are a few areas of Dubuque stony silt loam, 15 to 20 percent slopes, severely eroded. These areas were too small to map separately.

It is difficult to keep Dubuque soils, 15 to 20 percent slopes, severely eroded, productive, even if they are well managed. It is better to use them for pasture or trees than for tilled crops. Yields of pasture will be high in spring and in fall if the pastures are renovated. In midsummer the pastures are sometimes damaged by drought. (Capability unit VIe–1.)

Dubuque soils, 20 to 30 percent slopes, severely eroded (DuF3).—The soils of this mapping unit have a finer textured surface layer and a thinner solum than Dubuque silt loam, 20 to 30 percent slopes, and more of the brown subsoil is exposed. In most of the areas, nearly all of the original surface layer has been lost through erosion.

The soils are best used for limited grazing or should be kept in trees. If feasible, the pastures should be renovated. In addition, they need to be protected from overgrazing. In forested areas the trees need protection from fire and from grazing by livestock. Yields will be higher if the trees are cut selectively. (Capability unit VIIe–1.)

Dubuque soils, deep, 2 to 6 percent slopes, severely eroded (DvB3).—From one-third to nearly all of the surface layer in these soils has been lost through water erosion. Consequently, the present surface layer contains less organic matter than that of Dubuque silt loam, deep, 2 to 6 percent slopes, and these soils are lower in fertility. Also, the moisture-supplying capacity is somewhat lower.

If the soils are to be made more productive, practices will be needed to prevent further erosion. A cropping system in which grasses and legumes are grown more of the time than clean-tilled crops should be used. Applying large amounts of a complete fertilizer and manure will help to build up the supplies of organic matter and plant nutrients in the soils. (Capability unit IIIe–1.)

Dubuque soils, deep, 6 to 10 percent slopes, severely eroded (DvC3).—These soils have lost from one-third to nearly all of the surface layer through erosion. Consequently, the supply of organic matter and the moisture-supplying capacity are lower than for Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded, and the soils contain less plant nutrients.

The soils require careful management to prevent further damage by erosion. They need to be kept in grasses and legumes for 2 out of 4 years and require large amounts of fertilizer and manure. (Capability unit IVe–1.)

Dubuque soils, deep, 10 to 15 percent slopes, severely eroded (DvD3).—Most of the surface layer of these soils has been lost through erosion. If the soils are plowed, the brownish subsoil is exposed.

Extra care is required in managing these soils. Intensive practices are needed to prevent further erosion. A cropping system should be used in which grasses and legumes are grown more of the time than clean-tilled crops. Large amounts of a complete fertilizer and manure will be needed. (Capability unit IVe–1.)

Dubuque soils, deep, 15 to 20 percent slopes, severely eroded (DvE3).—These soils have lost more than two-thirds of the original surface layer through water erosion. As a result, the present surface layer contains little organic matter and is low in fertility. The moisture-supplying capacity has also been lowered, making the soils more droughty.

These soils are not suited to row crops. They need to be kept in pasture or planted to trees. Careful management will be required to prevent further damage through erosion and to increase the supply of plant nutrients. If large amounts of a commercial fertilizer, lime, and manure are applied and the areas are reseeded to a mixture of alfalfa and bromegrass, fairly high yields can be obtained. (Capability unit VIe–1.)

Dubuque soils, deep, 20 to 30 percent slopes, severely eroded (DvF3).—The soils of this mapping unit have less than one-third of the original surface layer remaining. They are better suited to pasture or trees than to tilled crops. Careful management is required, however, to establish pastures. Large amounts of fertilizer and manure will be needed before the areas can be reseeded. If grazing is controlled and supplemental applications of a nitrogen fertilizer are added, moderate yields of pasture can be obtained. In forested areas the trees will need protection from fire and grazing. (Capability unit VIIe–1.)

Dubuque stony silt loam, 10 to 15 percent slopes (DyD).—This soil generally occurs on the narrower ridgetops. Typically, the surface layer is light yellowish-brown, friable stony silt loam, and the subsoil is brown, cherty silty clay loam. The substratum, a reddish-brown clay, is similar to that of the other Dubuque soils.

This soil has a moderate hazard of erosion. Fertility is moderate to low, and the moisture-supplying capacity is low.

In places this soil is too stony to cultivate. It is best suited to permanent pasture or trees. If it is pastured, care is needed to prevent overgrazing. Areas that are in trees require protection from fire and from grazing by livestock. The trees should be cut selectively. (Capability unit IIIe–2.)

Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded (DyD2).—This soil is moderately eroded but is otherwise similar to Dubuque stony silt loam, 10 to 15 percent slopes. Tillage and overgrazing have caused it to lose from ⅓ to ⅔ of the original surface layer.

This soil can be used and managed about the same as Dubuque stony silt loam, 10 to 15 percent slopes. Lime, large amounts of commercial fertilizer, and manure should be added if the areas have been cultivated. Grasses and legumes can then be seeded. If pastures are well managed, yields are moderate. (Capability unit IIIe–2.)

Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded (DyE2).—This soil is somewhat stonier and has a shallower profile than Dubuque stony silt loam, 10 to 15 percent slopes. In most places from ⅓ to ⅔ of the original surface layer has been lost through erosion.

The soil is low in fertility and in moisture-supplying capacity. The hazard of erosion is severe.

Most of this soil is in forest, but a few areas are in permanent pasture. Yields are generally low on the pastures. If feasible, the pastures should be renovated. In forested areas the trees need protection from fire and grazing. Selective cutting and replanting will encourage growth of the more desirable kinds of trees. (Capability unit IVe–2.)

Dubuque stony silt loam, 20 to 20 percent slopes (DyF).—This soil is similar to Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded, but it has stronger slopes. It occurs in fairly small areas near tracts of Stony rock land.

Most of this soil is in forest and should not be cleared. The trees require protection from fire and grazing. Selective cutting and replanting will encourage growth of the more desirable kinds of trees. (Capability unit VIe–1.)

Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded (DyF2).—This soil has lost more than one-third of its original surface layer through erosion. Most of the areas are pastured. They should be fenced and planted to desirable kinds of trees as soon as feasible. Trees that have already been established by natural reproduction need protection from fire and grazing. If desirable kinds of trees are encouraged and the trees are cut selectively, yields will increase. (Capability unit VIe–1.)

Dubuque stony silt loam, 30 to 45 percent slopes (DyG).—This soil is the most extensive of the Dubuque stony silt loams. It occupies fairly large areas near tracts of Stony rock land. Little of it has been cleared. The areas that have been cleared have generally been allowed to revert to woodland. In a few places the soil is moderately eroded.

Trees on this soil need protection from fire and from grazing by livestock. The trees should be cut selectively so that the more desirable kinds are encouraged. (Capability unit VIIe–1.)

Fayette Series

The Fayette series is made up of deep, silty soils that are well drained and that range from sloping to steep. The soils are on rolling upland ridges and on valley slopes. They have formed under a cover of hardwoods in a blanket of silt that is 42 or more inches thick. The silt was probably blown onto the uplands about the time of the last glaciation by winds from the flood plains of the Mississippi River. It overlies limestone or sandstone bedrock. The texture of the silt nearest the river is coarser than that of the silt farthest from the river.

The Fayette soils are mostly in the western and southern parts of the county where the covering of silt is thickest. They are near soils of the Dubuque series. Typically, the Fayette soils have a grayish-brown, friable surface layer. The subsoil is yellowish-brown silty clay loam, and the substratum is yellowish-brown silt loam.

The subsoil of the soils on the valley slopes is less well developed than that of the soils on the upland ridges; stones and boulders occur on the surface and throughout the profile. Consequently, two topographic phases of Fayette silt loam—uplands and valleys—are recognized. The uplands phases are on rolling ridgetops above areas of Stony rock land. The valleys phases occupy the lower parts of the valley slopes and occur below areas of Stony rock land.

The Fayette soils are generally moderately high in natural fertility and in their capacity to supply moisture. Permeability is moderate. The soils are slightly acid to strongly acid. Their slopes range from 2 to 30 percent, but in most places they are between 6 and 15 percent. The soils are eroded easily by water, particularly if the slopes are long and steep.

Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded (FaB2).—This soil is on broad ridgetops near soils of the Dubuque series. The following describes a profile in a woodlot:

A 0 to 3 inches, very dark grayish-brown silt loam; weak, thin, platy to moderate, fine, granular structure; friable; roots abundant; thin layer of forest litter on the surface; pH 6.5.
3 to 14 inches, pale-brown silt loam; moderate, thin, platy structure; friable; slightly vesicular; roots plentiful; pH 5.5.
B 14 to 17 inches, yellowish-brown silt loam; moderate, medium, subangular blocky structure; friable; roots plentiful; light-gray silica coatings on faces of peds; pH 5.2.
17 to 32 inches, yellowish-brown, light silty clay loam; moderate to strong, medium, subangular blocky structure; firm, roots plentiful; light-gray silica coatings on faces of peds; pH 5.1.
32 to 40 inches, yellowish-brown, heavy silt loam; moderate, coarse, subangular blocky structure; friable; pH 5.5.
C 40 inches +, yellowish-brown silt loam; massive; friable; pH 5.8.

In most places this soil has lost more than one-third of its original surface layer through water erosion. In only a few small, scattered areas is the soil uneroded or only slightly eroded.

Corn, small grains, and forage crops grow well on this soil. A suitable cropping system is required, and practices are needed to prevent further losses of soil. In some places yields are limited by lack of organic matter and nitrogen. If the supply of plant nutrients is kept high, however, high yields are obtained. A complete fertilizer should be applied according to the needs indicated by soil tests. Enough lime will be needed to raise the pH to 6.5 or 7.0. (Capability unit IIe–1.)

Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded (FaB3).—This soil is more eroded than Fayette silt loam, 2 to 6 percent slopes, moderately eroded, and its surface layer is lighter colored and contains less organic matter and nitrogen. It has lost more than two-thirds of the original surface soil and part of the subsoil through erosion. In more than one-third of the acreage, plowing has exposed the subsoil of yellowish-brown silty clay. The present surface layer is about 4 inches thick.

Practices are needed to prevent this soil from eroding further and crop yields from declining. Applying large amounts of a complete fertilizer and manure will help to restore productivity. In addition, a cropping system is required in which grasses and legumes are grown for a greater number of years than clean-tilled crops. An adequate supply of plant nutrients needs to be maintained. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 6 to 10 percent slopes (FaC).—This soil is less eroded than Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded, although it has stronger slopes. Less than one-third of the original surface soil has been lost through erosion.

This soil is well suited to all the crops commonly grown in the county. If an adequate supply of plant nutrients is maintained and erosion is controlled, high yields are obtained. This soil needs a slightly longer cropping system than Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded. If it is cropped more intensively, the soil requires terracing or stripcropping. Maintaining good supplies of plant nutrients and organic matter in the soil will help to prevent erosion. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded (FaC2).—This soil, the most extensive of the Fayette soils in the county, occupies fairly large areas. It is similar to Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded, but its stronger slopes make it more erodible. Consequently, it cannot be used so intensively. Longer cropping systems are required in which hay and pasture crops are grown more of the time than clean-tilled crops. In addition, supporting practices are needed to prevent further damage through erosion.

In many places yields are low because the soil needs nitrogen and potash. Adding large amounts of a complete fertilizer and organic matter will help to improve productivity. Apply lime according to the needs indicated by soil tests. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded (FaC3).—This soil occupies almost as large an acreage as Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded. More than two-thirds of the original surface soil has been lost through erosion, and, in places, part of the subsoil. When the soil is plowed, part of the subsoil is mixed with the remaining surface soil and the surface layer then has a lighter color than formerly; patches of yellowish-brown subsoil are exposed in more than two-thirds of the acreage.

If this soil is well managed, crops make fairly high yields. The soil should not be used for cultivated crops, however, more than 1 year out of 4. Using a longer cropping system, adding large amounts of a complete fertilizer and manure, and applying other practices to conserve the soil will help to prevent further damage through erosion. (Capability unit IVe–1.)

Fayette silt loam, uplands, 10 to 15 percent slopes (FaD).—This soil has a thinner surface layer than Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded, and a lower content of organic matter. It also has a greater hazard of erosion, and crops need to be grown in a somewhat longer rotation.

Although this soil is not suited to intensive cropping, the crops that are grown make high yields if an adequate supply of plant nutrients is maintained and erosion is controlled. The crops respond well if a complete fertilizer and manure are added. Terracing and stripcropping will help to prevent erosion. Lime is required, particularly if alfalfa is to be established. The lime should be applied according to the needs indicated by soil tests. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded (FaD2).—This soil has lost from ⅓ to ⅔ of its original surface layer through erosion. In a few small areas the yellowish-brown subsoil is exposed. Consequently, the surface layer is lighter colored and contains less organic matter than that of Fayette silt loam, uplands, 10 to 15 percent slopes. The two soils are otherwise similar and can be used and managed about the same. This soil, however, requires more careful use of practices to prevent further erosion. Also, it needs larger amounts of commercial fertilizer and manure. (Capability unit IIIe–1.)

Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded (FaD3).—Nearly all of the surface layer of this soil has been removed through water erosion, and, in some areas, part of the subsoil is gone. Part of the yellowish-brown silty clay loam from the subsoil has been mixed with the remaining surface soil by plowing. As a result, the present surface layer is lighter colored and less friable than the original one, and it has poorer tilth.

This soil is not well suited to cultivated crops. It is best kept in permanent hay and pasture or should be planted to trees. Adding large amounts of manure will help to increase the content of organic matter and to improve tilth. If the pastures are renovated properly, forage crops will make fairly high yields. (Capability unit IVe–1.)

Fayette silt loam, uplands, 15 to 20 percent slopes (FaE).—The surface layer of this soil has a slightly lighter color and is somewhat thinner than that of the less sloping upland Fayette soils. The solum is 30 to 36 inches thick.

The strong slopes, rapid runoff, and serious hazard of erosion limit the use of this soil for crops. The soil can be cropped 1 year out of 4 if a suitable cropping system is used, the supply of plant nutrients is maintained, and other practices are applied to conserve the soil. Extra care is required, however, to prevent erosion. If the areas are planted to grass and then renovated periodically, yields will be fairly high. (Capability unit IVe–1.)

Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded (FaE2).—This soil has lost about half of the original surface soil through erosion. The present surface layer is lighter colored and contains less organic matter than that of Fayette silt loam, uplands, 15 to 20 percent slopes, and is about 5 to 8 inches thick. The two soils can be used and managed about the same. This soil requires more careful management, however, to prevent further losses of soil and corresponding lowering of yields. In addition, larger amounts of commercial fertilizer and manure are needed to help restore the supply of plant nutrients and to prevent further damage through erosion. (Capability unit IVe–1.)

Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded (FaE3).—Nearly all of the surface layer of this soil has been removed through erosion. In some places part of the subsoil has been lost. The present plow layer has a yellowish-brown color and is low in organic matter and plant nutrients.

It is best to use this soil for forage crops or trees. Areas that are now used for cultivated crops need to have practices applied to control erosion until they can be

put to less intensive use. If the soil is used for pasture or hay crops, the areas will need to be renovated before satisfactory yields can be made. If the renovated areas are pastured, grazing must be controlled to prevent further losses of soil. Trees planted on this soil need protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Fayette silt loam, uplands, 20 to 30 percent slopes (FaF).—This soil has a slightly thinner surface layer and subsoil than the less sloping upland Fayette soils. Because of the stronger slopes, water runs off rapidly and makes the soil droughty. The hazard of erosion is severe.

This soil is better suited to forage crops and to trees than to cultivated crops. Areas that are now cultivated should be planted to grass or trees as soon as feasible. If the soil is used for pasture or hay crops, the areas will need to be renovated. In the many areas that have been kept in trees, protection is needed from fire and from grazing by livestock. Selective cutting will encourage growth of the more desirable kinds of trees and thus increase yields. (Capability unit VIe–1.)

Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded (FaF2).—From ⅓ to ⅔ of the original surface layer of this soil has been removed through erosion. In some places plowing has mixed part of the yellowish-brown subsoil with the remaining surface soil. The soil can be used and managed about the same as Fayette silt loam, uplands, 20 to 30 percent slopes. Larger amounts of fertilizer and manure will be needed, however, to make the soil more productive. (Capability unit VIe–1.)

Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded (FaF3).—This soil has lost nearly all of its surface layer and, in some places, part of its subsoil through erosion. To prevent further losses of soil, cultivated areas should be taken out of cultivation as soon as feasible. Gullies form rapidly in this soil and in many places cause losses of crops and, also, damage to the crops on the more productive soils below.

This soil is generally too steep for hay crops. If adequate amounts of lime and fertilizer are applied and grasses and legumes are seeded, fairly high yields of pasture are obtained. The pastures need to be managed carefully to prevent damage from overgrazing. Trees planted on this soil require protection from fire and from grazing by livestock. (Capability unit VIIe–1.)

Fayette silt loam, valleys, 6 to 10 percent slopes (FvC).—This soil occurs on concave valley slopes below areas of Stony rock land. It has formed in a mixture of loess and local alluvial material that has washed down the slope.

The B horizon in this soil is not so well developed as that in the uplands phases, and a small amount of grit occurs throughout the profile. In a few places scattered stones and boulders occur on the surface and throughout the profile. Also, in some places the soil occurs below a sandstone escarpment and has a thin covering of fine sand.

The following describes a typical profile of Fayette silt loam, valleys, 6 to 10 percent slopes:

A 0 to 8 inches, dark grayish-brown silt loam; moderate, fine, granular structure; friable when moist; roots abundant; pH 6.5.
8 to 15 inches; grayish-brown silt loam; moderate, thin, platy structure; friable when moist; roots plentiful; pH 6.0.
B 15 to 35 inches, dark-brown to yellowish-brown, light silty clay loam; moderate, fine, subangular blocky structure; slightly firm; roots plentiful; pH 5.8.
C 35 inches +, yellowish-brown silt loam; massive; friable; pH 5.8.

This soil is moderately high in ability to hold available plant nutrients. The hazard of erosion is slight to moderate, and in most places the soil is slightly eroded.

If this soil is well managed, high yields are obtained of all the crops commonly grown in the county. The supplies of plant nutrients and organic matter should be kept high and a suitable cropping system used. Where feasible, terracing, stripcropping, and other practices should be applied to prevent further losses of soil as the result of water erosion. Corn and oats respond well if nitrogen fertilizer is added. In most places lime will be needed for legumes to grow well. The areas that have sand or stones on the surface are small; consequently, they are managed the same as surrounding soils. (Capability unit IIIe–1.)

Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded (FvC2).—This soil has lost from ⅓ to nearly ⅔ of the original surface soil through water erosion. In a few small areas, nearly all of the original surface soil is gone.

This soil can be used and managed about the same as Fayette silt loam, valleys, 6 to 10 percent slopes. Greater care is needed, however, to prevent further erosion. If erosion is controlled and the supply of plant nutrients is maintained, high yields are obtained. Adding large amounts of a complete fertilizer and manure to the severely eroded areas will help to improve yields. (Capability unit IIIe–1.)

Fayette silt loam, valleys, 10 to 15 percent slopes (FvD).—This soil has stronger slopes than Fayette silt loam, valleys, 6 to 10 percent slopes, and a slightly thinner surface layer. The present surface layer is 10 to 12 inches thick.

This soil is not so well suited to intensive cropping as Fayette silt loam, valleys, 6 to 10 percent slopes. More careful management is required to prevent further erosion and corresponding lowering of yields. Terracing stripcropping, and other soil-conserving practices are needed, and a suitable cropping system should be used. The supply of plant nutrients needs to be kept high to maintain high yields. If a complete fertilizer and manure are applied, crops respond well. Corn and oats make even better yields if supplemental nitrogen fertilizer is added. (Capability unit IIIe–1.)

Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded (FvD2).—This soil has lost from ⅓ to ⅔ of its original surface layer through erosion. The present surface layer is 5 to 8 inches thick. In a few small areas, the soil is severely eroded.

This soil can be used and managed about the same as Fayette silt loam, valleys, 10 to 15 percent slopes, but more careful management is needed to prevent further erosion. Also, the severely eroded areas require larger amounts of fertilizer and manure. If a complete ferti-

lizer is added, crops respond well. Yields of corn and oats are doubled in many places if supplemental nitrogen fertilizer is applied. (Capability unit IIIe–1.)

Fayette silt loam, valleys, 15 to 20 percent slopes (FvE). This soil has a slightly lighter colored and thinner surface layer than Fayette silt loam, valleys, 6 to 10 percent slopes. The surface layer is generally 8 to 10 inches thick. The hazard of erosion is moderate to severe. Careful management is needed to protect the soil from serious erosion.

To keep this soil productive, use a cropping system in which close-growing crops are grown a greater number of years than clean-tilled crops. Also, apply other practices to prevent erosion and to maintain the supply of plant nutrients. Unless practices are used to control erosion, grow row crops no oftener than 1 year out of 4. If the supply of plant nutrients is kept high, forage crops make fairly high yields. Nonleguminous hay and pasture crops respond well if a supplemental nitrogen fertilizer is applied. (Capability unit IVe–1.)

Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded (FvE2).—This soil has lost between ⅓ and ⅔ of its original surface soil through water erosion. Plowing has mixed part of the subsoil with the remaining surface soil. As a result, the present surface soil has a lighter color than the original one.

This soil can be used and managed about the same as Fayette silt loam, valleys, 15 to 20 percent slopes, but it has a thinner surface layer and is lower in organic matter. Consequently, more careful management is needed to prevent further losses of soil. Also, larger amounts of a complete fertilizer and manure must be applied to restore the supply of plant nutrients and the content of organic matter. (Capability unit IVe–1.)

Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded (FvE3).—This soil has lost most of its original surface soil through erosion, and, in some places, part of the subsoil is gone. The present plow layer is dark brown and has a very low content of organic matter.

Because of its strong slopes and serious erosion, this soil is not suited to row crops. It is best suited to permanent pasture or to hay crops. If the pastures are renovated adequately, yields of forage crops are fairly high. The yields will be even better, however, if a supplemental nitrogen fertilizer is added. (Capability unit VIe–1.)

Fayette silt loam, valleys, 20 to 30 percent slopes (FvF).—This steep soil is hard to cultivate. The hazard of erosion is serious, and the soil is generally not suited to crops. It is probably best to keep it in trees or in pasture that has been renovated.

To obtain fairly high yields of pasture, suitable renovating practices will be needed. Controlling grazing will help to prevent losses of soil and, thus, increase yields of forage crops. Trees require protection from fire and from grazing by livestock. Selective cutting in woodlots will increase yields and will help to encourage the most desirable kinds of trees. (Capability unit VIe–1.)

Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded (FvF2).—This soil has lost between ⅓ and ⅔ of its original surface soil through erosion. It is similar to Fayette silt loam, valleys, 20 to 30 percent slopes, and can be used and managed the same. More careful management is needed, however, to prevent further losses of soil. Also, larger amounts of a complete fertilizer, lime, and manure will be needed in many places to establish seedings of pasture plants. Areas in trees need protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded (FvF3).—Nearly all of the original surface layer of this soil has been removed through erosion. When the soil is plowed, the dark-brown subsoil is exposed in many places. It is best to restrict the use of this soil to forest or to limited grazing by livestock. Care is needed to prevent overgrazing of pastured areas, and, if feasible, renovating practices should be applied. In forested areas trees require protection from fire and from grazing by livestock; the yields of trees can be increased by selective cutting. (Capability unit VIIe–1.)

Gale Series

The Gale series is made up of moderately deep, silty soils that are well drained. The soils are in the uplands. They have convex slopes and generally occur in fairly small areas between tracts of Stony rock land and alluvial soils of the valleys. These soils have formed in loess under a forest cover of maple, oak, hickory, and other kinds of hardwoods. Weathered sandstone bedrock is generally at depths of 24 to 36 inches.

The Gale soils are associated with the Hixton soils and with the valleys phases of the Fayette soils. They have a dark grayish-brown, silty surface soil and a subsoil of yellowish-brown silty clay loam. The substratum is white to yellow, weathered sandstone.

These soils are moderate in natural fertility and in moisture-supplying capacity. They have a fairly low content of organic matter. Surface runoff and internal drainage are medium. The soils are medium acid.

Gale silt loam, 2 to 10 percent slopes (GaC).—This soil occupies fairly small areas throughout the county. The following describes a typical profile:

A 0 to 7 inches, dark grayish-brown silt loam; moderate, fine, granular structure; friable; roots abundant; pH 6.0.
7 to 13 inches, brown silt loam; moderate, medium, platy structure; friable; roots plentiful; pH 5.8.
B 13 to 18 inches, dark-brown, heavy silt loam; moderate, medium, subangular blocky structure with grayish-brown silica coatings on faces of the peds; friable; roots plentiful; pH 5.6.
18 to 31 inches, dark yellowish-brown silty clay loam; moderate, medium, subangular blocky structure with grayish-brown silica coatings on faces of the peds; firm; roots plentiful; pH 5.6.
D 31 inches +, white to yellow, weathered sandstone; massive in place, but single grain if disturbed; in places the sandstone bedrock is entirely decomposed, and the substratum is made up of loose sand.

This soil has a moderate hazard of erosion. It is suited to all the crops commonly grown in the county. In many places yields are low, however, because the soil needs organic matter and nitrogen.

This soil requires practices to prevent erosion. It requires a suitable cropping system to help increase the content of organic matter. In addition, an adequate supply of plant nutrients should be maintained. To obtain high yields of legumes and other crops, apply

lime according to the needs indicated by soil tests. (Capability unit IIe–2.)

Gale silt loam, 2 to 10 percent slopes, moderately eroded (GaC2).—This soil has lost from ⅓ to ⅔ of its original surface soil through water erosion, and in some small areas the dark-brown subsoil is exposed. Consequently, this soil contains less organic matter and is less fertile than Gale silt loam, 2 to 10 percent slopes, and the moisture-holding capacity is lower. The two soils can be used and managed about the same, but this soil requires more careful management to prevent further erosion. In dry seasons crops are damaged somewhat by lack of moisture, especially in areas where the soil is the most eroded. (Capability unit IIe–2.)

Gale silt loam, 2 to 10 percent slopes, severely eroded (GaC3).—This soil has a thinner, less friable surface layer than Gale silt loam, 2 to 10 percent slopes, and the rest of the solum is thinner. This soil is more droughty. It has lost nearly all of the original surface layer through erosion and, in some places, part of the subsoil. Plowing has mixed part of the subsoil with the remaining surface soil. As a result, the present plow layer is dark brown and is low in organic matter and in plant nutrients.

This soil should not be used so intensively as Gale silt loam, 2 to 10 percent slopes. If it is cropped, a suitable cropping system and supporting practices to prevent erosion are required to obtain high yields. It also needs large amounts of a complete fertilizer and manure. (Capability unit IIIe–2.)

Gale silt loam, 10 to 15 percent slopes, moderately eroded (GaD2).—This soil has stronger slopes than Gale silt loam, 2 to 10 percent slopes, and a slightly thinner, lighter colored surface soil. Depth to the underlying material is less, ranging from 20 to 30 inches, and this soil is more droughty. The hazard of erosion is moderate to severe.

This soil requires a cropping system that will increase the content of organic matter. Row crops should be grown no oftener than 1 year out of 4. The soil needs careful management to prevent further erosion and lowering of the moisture-holding capacity. In many places it needs nitrogen fertilizer and potash. Adding large amounts of commercial fertilizer and manure will help to increase yields. (Capability unit IVe–2.)

Gale silt loam, 10 to 15 percent slopes, severely eroded (GaD3).—More than two-thirds of the surface layer of this soil has been lost through water erosion. In some places part of the subsoil is gone. Where the soil has been cultivated, part of the subsoil has been turned up in many places.

The strong slopes, the thinness of the solum over the underlying sandstone, and the severe hazard of erosion make this soil better suited to forage crops or forest than to cultivated crops. If an adequate supply of plant nutrients is maintained, yields of pasture and hay are moderate. The areas used for pasture or hay should be renovated as the need arises, and the pastured areas protected from overgrazing. Forested areas need protection from fire and from grazing by livestock. (Capability unit IVe–2.)

Gale silt loam, 15 to 20 percent slopes, moderately eroded (GaE2).—This soil is similar to Gale silt loam, 10 to 15 percent slopes, moderately eroded, and it can be used and managed about the same. It requires more careful management, however, to prevent further erosion. (Capability unit IVe–2.)

Gale silt loam, 15 to 20 percent slopes, severely eroded (GaE3).—This soil is not suited to row crops and is best kept in forage crops or in trees. If the soil is used for forage crops, it will need careful management to prevent further damage through water erosion. (Capability unit VIe–1.)

Gale silt loam, 20 to 30 percent slopes (GaF).—This soil has a thinner profile and is droughtier than the less steep Gale soils. Depth to weathered sandstone is generally less than 30 inches.

Because of the strong slopes, it is hard to use farm machinery on this soil. Consequently, cultivated crops are not grown extensively, and much of the soil has been kept in pasture or forest. The areas that are cultivated should be seeded to grasses and legumes. The pastured areas need protection from overgrazing, and the forested areas, from fire and from grazing by livestock. (Capability unit VIe–1.)

Gale silt loam, 20 to 30 percent slopes, moderately eroded (GaF2).—This soil occurs in small, scattered areas. About half of the original surface layer has been removed through water erosion. Consequently, the solum is thinner than that of Gale silt loam, 20 to 30 percent slopes, or only about 20 to 24 inches thick. Nevertheless, the two soils can be used and managed about the same. (Capability unit VIe–1.)

Garwin Series

The soils of the Garwin series are deep and are poorly drained. They occur on the upland ridges on gentle, concave slopes and in the depressions. The soils have formed in loess that is 42 or more inches thick. In some places they are underlain by Maquoketa shale at depths of more than 10 feet.

The Garwin soils occur near the Atterberry, Muscatine, and Tama soils, but they have poorer drainage than these nearby soils. Typically, their surface layer is black silty clay loam. Their subsoil is dark gray and the substratum is brownish gray.

These soils are fertile. Their content of organic matter is high. The soils are generally neutral to mildly alkaline. Only one soil, Garwin silty clay loam, is mapped in the county.

Garwin silty clay loam (Gw).—This is a productive soil, but water stands on it in many places during wet periods. The following describes a typical profile:

A 0 to 8 inches, black silty clay loam; moderate, coarse, granular structure; friable; plant roots abundant; pH 7.5.

8 to 15 inches, very dark gray silty clay loam; moderate, medium, granular structure; friable; a few plant roots; pH 7.5.

B_g 15 to 30 inches, very dark gray to dark gray silty clay loam with strong-brown mottles; moderate, fine, subangular blocky structure in upper part, but medium, subangular blocky structure in lower part; firm when moist, but slightly plastic when wet; pH 8.0.

G 30 inches +, light brownish-gray, heavy silt loam that is highly mottled with yellowish brown; massive; friable; pH 8.0.

Good tilth is maintained easily. If drained, the soil is well suited to most of the crops grown in the county. Alfalfa, however, cannot be grown unless the areas are adequately drained. Row crops can be grown 3 out of 4 years if an adequate supply of plant nutrients is maintained. The soil does not need lime. It generally needs potash, but crops respond well if a complete fertilizer is added. Yields of corn are improved if a starter fertilizer is applied in spring and supplemental nitrogen fertilizer is added later. (Capability unit IIw–1.)

Hesch Series

The Hesch series is made up of well-drained loams and sandy loams. The soils are in small areas on valley slopes and are scattered throughout the county. They have formed under prairie or prairie-oak vegetation from fine-grained sandstone containing small amounts of even finer material. Depth to the underlying sandstone ranges from 18 to 40 inches.

These soils are near the Hixton soils. Typically, they have a very dark brown surface soil, a brown to dark-brown subsoil, and a yellowish-brown substratum that is sandy or contains sandstone.

The Hesch soils are moderate in natural fertility. Their moisture-supplying capacity is moderate to moderately low. The soils are slightly acid to neutral. Erosion is a hazard, especially on the stronger slopes.

Hesch loam, 2 to 10 percent slopes, moderately eroded (HeC2).—This soil is on the lower parts of valley slopes or on foot slopes. The following describes a typical profile:

A 0 to 12 inches, very dark brown to dark grayish-brown loam; moderate, fine, granular structure; friable; roots abundant; contains several wormcasts; pH 6.8.

B 12 to 19 inches, brown very fine sandy loam; weak, medium, subangular blocky structure; friable; many small, fibrous roots and several old root channels; pH 6.5.

19 to 32 inches, dark-brown sandy clay loam; moderate, fine, subangular blocky structure; slightly hard when dry, but plastic when wet; occasional sandstone pebbles; pH 6.5.

C 32 inches +, yellowish-brown fine sandy loam; massive; friable; contains fragments of sandstone and grades to sandstone bedrock at depths of 42 inches; the sandstone contains lenses and streaks of greenish (glauconitic), fine-grained material; pH 7.0.

In most places this soil has lost from ⅓ to ⅔ of the original surface soil through erosion; in a few small areas, the soil is severely eroded. The moisture-supplying capacity is moderate.

If this soil is well managed, it can be used fairly intensively. Yields are fairly high if an adequate supply of plant nutrients is maintained and erosion is controlled. Using a suitable cropping system and supporting practices to protect the soil will help to prevent further erosion. Crops on this soil respond well if manure is added and if a complete fertilizer and lime are applied according to the needs indicated by soil tests. Corn and nonleguminous hay and pasture crops need a nitrogen fertilizer. (Capability unit IIe–2.)

Hesch loam, 10 to 15 percent slopes, moderately eroded (HeD2).—This soil has stronger slopes and a slightly thinner solum than Hesch loam, 2 to 10 percent slopes, moderately eroded. Also, it is likely to be droughty during extended dry periods. In many small areas the soil is slightly or severely eroded. The solum is generally less than 30 inches thick.

This soil requires a suitable cropping system and supporting practices to prevent further erosion. In addition, it needs to have an adequate supply of plant nutrients. Row crops should be grown no oftener than 1 year out of 4, unless practices are used to prevent further erosion. Crops on this soil respond well if manure is added and if a complete fertilizer and lime are applied according to the needs indicated by soil tests. (Capability unit IIIe–2.)

Hesch loam, 15 to 20 percent slopes, moderately eroded (HeE2).—This soil has a thinner solum than Hesch loam, 2 to 10 percent slopes, moderately eroded. Also, it is droughty and the hazard of erosion is more serious. The two soils can be used and managed about the same. This soil should be used less intensively, however, and requires more careful management. (Capability unit IVe–2.)

Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded (HcC2).—This soil has a thinner solum than Hesch loam, 2 to 10 percent slopes, moderately eroded. Also, the surface layer and subsoil are coarser textured and the subsoil is more friable. Sandstone bedrock or weathered sandstone is at depths ranging from 24 to 30 inches. The soil is droughty. The following describes a typical profile:

A 0 to 10 inches, very dark brown fine sandy loam; weak, medium, granular structure; very friable; abundant roots; pH 6.5.

B 10 to 16 inches, brown fine sandy loam; weak, medium, subangular blocky structure; very friable; roots plentiful; pH 6.0.

16 to 28 inches, dark-brown loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 6.2.

C 28 inches +, yellowish-brown to light yellowish-brown loamy sand that grades to sandstone at a depth of 36 inches; single grain and very friable in upper part, but becomes massive with increasing depth; pH 6.5.

In most places this soil has lost about one-half of its original surface layer through erosion. A few small areas are slightly or severely eroded. The substratum has little capacity to hold moisture; consequently, further erosion will make the soil even more droughty.

Crops make fairly high yields on this soil if the supply of plant nutrients is maintained and erosion is controlled. Row crops should be grown, however, no oftener than 1 year out of 4, unless suitable practices are applied to prevent further erosion. Crops respond well if manure is added and if a complete fertilizer and lime are applied according to the needs indicated by soil tests. (Capability unit IIIs–2.)

Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded (HcD2).—This soil has a thin solum and a serious hazard of erosion. It is not suited to row crops and should be kept in grasses or legumes. If suitable renovating practices are applied, moderate yields of forage crops are obtained. The pastures are likely to be damaged by drought in midsummer, but they yield well in spring and fall. (Capability unit IVs–2.)

Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded (HcD3).—This soil has lost most of its surface layer and, in some places, part of its subsoil through

erosion. As a result, the plow layer is browner than that of Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded, and contains less organic matter. Also, depth to the sandy substratum is less.

Even if well managed, this soil is difficult to keep from eroding. It is best suited to hay crops, to limited grazing, or to trees. If the soil is used for pasture or hay crops, the areas should be renovated. Areas that are planted to trees or that are kept in forest need protection from fire and from grazing by livestock. (Capability unit VIs–1.)

Hesch fine sandy loam, 15 to 20 percent slopes (HcE).—This soil generally has a thinner surface layer and subsoil than the Hesch soils on less strong slopes. Much of it is in forest or in woodland that is pastured. The strong slopes and serious hazard of erosion make this soil hard to manage if it is cultivated. It is, therefore, better to use it for rotation pasture or for trees than for cultivated crops. In pastured areas renovating practices are required and care is needed to prevent overgrazing. The forested areas require protection from fire and from grazing by livestock. (Capability unit VIs–1.)

Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded (HcE2).—This soil has lost from 3 to 5 inches of its original surface layer through water erosion. It can be used and managed about the same as Hesch fine sandy loam, 15 to 20 percent slopes, but more careful management is needed to establish pastures on this soil. Also, larger amounts of commercial fertilizer and manure are needed to obtain comparable yields of forage. (Capability unit VIs–1.)

Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded (HcE3).—This soil occurs in widely scattered areas that are less than 5 acres in size. It has lost most of its original surface layer through erosion. In cultivated areas plowing has mixed part of the brown upper part of the subsoil with the remaining surface soil. The soil is better suited to limited pasturing or to trees than to cultivated crops. Management is similar to that of Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded. (Capability unit VIIs–1.)

Hesch fine sandy loam, 20 to 45 percent slopes (HcF).—The solum of this soil is thinner than that of Hesch fine sandy loam, 15 to 20 percent slopes. The serious hazard of erosion and difficulty in using farm machinery on its strong slopes make this soil unsuited to cultivation. This soil needs to be used for limited grazing or kept in forest. Care is needed to prevent overgrazing in the pastures. Forested areas require protection from fire and from grazing by livestock. (Capability unit VIIs–1.)

Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded (HcF2).—This soil has lost more than one-third of its original surface layer through erosion. In many small areas it is severely eroded. Otherwise, this soil is similar to Hesch fine sandy loam, 20 to 45 percent slopes, and it can be used and managed about the same. (Capability unit VIIs–1.)

Hixton Series

The Hixton soils are well drained and occur on valley slopes. They have formed under a cover of hardwoods from fine-grained sandstone containing small amounts of even finer materials.

These soils are near the Hesch and Gale soils and near the valleys phases of the Fayette soils. Their surface soil is grayish-brown or dark grayish-brown loam or fine sandy loam. Their subsoil is yellowish-brown loam and is underlain by a substratum of sand or sandstone. Depth to the substratum ranges from 20 to 36 inches, depending somewhat on the slope and on the degree of erosion.

The natural fertility of these soils is moderate to very low. The soils are slightly acid to medium acid. Permeability is moderately rapid, and the moisture-supplying capacity is moderate to moderately low.

Hixton loam, 2 to 10 percent slopes (HxC).—This soil generally occupies small areas near other Hixton soils. In some places, however, it lies on low ridges between drainageways or occurs in narrow bands between soils of the Gale series and Stony rock land. The following describes a typical profile:

A 0 to 5 inches, dark grayish-brown loam; weak, medium, granular structure; friable; roots abundant; pH 6.4.
5 to 12 inches, grayish-brown fine sandy loam; weak, thick, platy structure; very friable; roots plentiful; pH 6.0.
B 12 to 26 inches, dark-brown to dark yellowish-brown loam to sandy clay loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 5.6.
C 26 inches +, light yellowish-brown to yellow fine sand; single grain; loose; grades to fine-grained sandstone at varying depths; pH 6.5.

This soil has moderately rapid permeability. The moisture-supplying capacity and the hazard of erosion are moderate.

The soil is well suited to corn, oats, and forage crops. It can be cropped fairly intensively if the supply of plant nutrients is maintained and supporting practices are applied to control erosion. Yields of corn and forage crops, however, are sometimes lowered during periods of prolonged drought.

A suitable cropping system is required on this soil. Crops respond well if a complete fertilizer is applied. Yields of corn increase if a supplemental nitrogen fertilizer is added during the growing season. Lime is required for high yields of legumes and should be applied according to the needs indicated by soil tests. Adding manure will help to build up the content of organic matter. (Capability unit IIe–2.)

Hixton loam, 2 to 10 percent slopes, moderately eroded (HxC2).—This soil has lost between ⅓ and ⅔ of its original surface layer through water erosion. Consequently, it has a thinner surface layer and a thinner solum than Hixton loam, 2 to 10 percent slopes. The two soils can be used and managed about the same. This soil, however, requires more careful management to prevent further erosion and to build up the supply of plant nutrients and organic matter. Generally, yields on this soil are slightly lower. (Capability unit IIe–2.)

Hixton loam, 10 to 15 percent slopes, moderately eroded (HxD2).—This soil has a slightly lighter colored, thinner surface layer and subsoil than Hixton loam, 2 to 10 percent slopes. The color of the present surface layer is grayish brown. Depth to the sandy substratum is generally less than 30 inches.

This soil requires a suitable cropping system and tillage

practices to prevent further erosion. It also needs to have an adequate supply of plant nutrients and the content of organic matter maintained. Row crops should be grown no oftener than 1 year out of 4 unless supporting practices are applied to conserve the soil. The soil responds well if manure is added and if lime and a complete fertilizer are applied according to the needs indicated by soil tests. (Capability unit IIIe–2.)

Hixton loam, 10 to 15 percent slopes, severely eroded (HxD3).—This soil has a lower moisture-holding capacity than Hixton loam, 2 to 10 percent slopes. It has lost more than two-thirds of its original surface soil. In many places the brown subsoil has been exposed by plowing. The content of organic matter is very low, the soil is droughty, and much of the natural fertility is gone.

This soil is best suited to forage crops, but the areas require renovating periodically to obtain high yields. In midsummer, pastures and second cuttings of hay crops are sometimes damaged by drought. Careful management is needed to prevent further erosion and corresponding losses of plant nutrients and organic matter and lowering of moisture-holding capacity. Adding large amounts of manure will help to build up the content of organic matter. (Capability unit IVe–2.)

Hixton loam, 15 to 20 percent slopes, moderately eroded (HxE2).—This soil has stronger slopes and a greater hazard of erosion than Hixton loam, 10 to 15 percent slopes, moderately eroded. It has a lower moisture-supplying capacity, and runoff is more rapid. The two soils can be used about the same. This soil, however, requires more careful management to prevent further erosion, and yields are somewhat lower. It requires a cropping system that will maintain the content of organic matter. (Capability unit IVe–2.)

Hixton loam, 15 to 20 percent slopes, severely eroded (HxE3).—This soil is not suited to row crops and is best kept in permanent vegetation. It can be used about the same as Hixton loam, 10 to 15 percent slopes, severely eroded, but it requires intensive management to prevent further damage through water erosion. Much of the soil occurs in areas that are less than 3 acres in size. These small areas can be planted to trees if they are not within areas of soils that are better suited to cultivation. The trees will need protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Hixton loam, 20 to 30 percent slopes (HxF).—This soil has a thinner surface layer and subsoil than Hixton loam, 2 to 10 percent slopes. In addition, the content of organic matter and the moisture-supplying capacity are lower. The hazard of erosion is severe.

Because of the strong slopes, farm machinery is hard to use on this soil. Consequently, most of the soil has been kept in pasture or forest. Except in midsummer, yields of pasture are generally moderate. The pastures need protection from overgrazing to prevent damage through erosion; if feasible, they should be renovated. The forested areas require protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Hixton loam, 20 to 30 percent slopes, moderately eroded (HxF2).—Most of this soil has been cultivated. Consequently, most of it is eroded and has lost from ⅓ to ⅔ of the original surface layer. The soil can be used and managed about the same as Hixton loam, 20 to 30 percent slopes. Areas not already in permanent vegetation should be seeded to grasses and legumes or planted to trees. (Capability unit VIe–1.)

Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded (HfB2).—The surface layer of this soil is slightly coarser textured than that of Hixton loam, 2 to 10 percent slopes. Also, the subsoil is more friable and the solum is slightly thinner. Depth to the sandy substratum generally ranges from 20 to 30 inches. The following describes a typical profile:

A 0 to 6 inches, dark grayish-brown fine sandy loam; weak, medium, granular structure; very friable; roots plentiful; pH 6.0.
6 to 14 inches, light yellowish-brown fine sandy loam; weak, thick, platy structure; very friable; roots plentiful; pH 5.5.
B 14 to 24 inches, yellowish-brown loam; weak, medium, subangular blocky structure; friable; roots plentiful; contains a few fragments of sandstone; pH 5.6.
C 24 inches +, yellowish-brown fine sand; single grain; loose; grades to light yellowish-brown, fine-grained sandstone at a depth of 30 inches; pH 6.0.

This soil has a moderately low moisture-supplying capacity and is somewhat droughty during dry periods. The hazard of water erosion is moderate.

The soil is used mainly for corn, oats, hay crops, and pasture. If erosion is controlled and an adequate supply of plant nutrients is maintained, yields are moderate. In some places, where the slopes are long, the soil can be terraced or stripcropped.

Crops on this soil respond well if a complete fertilizer and manure are added. Yields of corn, oats, and nonleguminous hay crops are increased if a supplemental nitrogen fertilizer is applied. For high yields of legumes, lime should be applied according to the needs indicated by soil tests. (Capability unit IIIs–2.)

Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded (HfC2).—This soil has stronger slopes and a slightly greater hazard of erosion than Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded, but it is otherwise similar. It should not be cultivated so intensively and requires more careful management to prevent further erosion. Row crops should be grown no oftener than 1 year out of 4, even if adequate supporting practices are used to protect the soil. (Capability unit IVs–2.)

Hixton fine sandy loam, 10 to 15 percent slopes (HfD).—This soil has stronger slopes, a slightly thinner solum, and is more droughty than Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded. The content of organic matter is also lower, and the hazard of erosion is more severe. Depth to the sandy substratum is generally less than 24 inches.

This soil is better suited to pasture or trees than to cultivated crops. Row crops should not be grown unless supporting practices are applied to conserve the soil. The areas used for pasture need to be renovated. Forested areas need protection from fire and from grazing by livestock. (Capability unit IVs–2.)

Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded (HfD2).—This soil has lost from ⅓ to ⅔ of its original surface layer through water erosion. The depth to the sandy substratum is generally only 20 inches

or less. The present surface layer is lighter colored and contains less organic matter than that of Hixton fine sandy loam, 10 to 15 percent slopes, and the soil is more droughty. The two soils can be used and managed about the same, but this soil requires more careful management to prevent further erosion. (Capability unit IVs–2.)

Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded (HfD3).—This soil has lost more than two-thirds of its original surface layer through erosion. Plowing has mixed part of the subsoil with the remaining surface soil. As a result, the present surface layer is a lighter color than the original one.

This soil is better suited to pasture or trees than to cultivated crops. If feasible, the pastured areas should be renovated. Controlling grazing by livestock will help to prevent further erosion and lowering of the moisture-holding capacity. Forested areas require protection from fire and from grazing by livestock. (Capability unit VIs–1.)

Hixton fine sandy loam, 15 to 20 percent slopes (HfE).—Most of this soil has been kept in pasture or trees. It can be used about the same as Hixton fine sandy loam, 10 to 15 percent slopes, and management is similar. Because of its stronger slopes and the slightly greater hazard of erosion, however, more careful management is needed. (Capability unit VIs–1.)

Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded (HfE2).—Most of this soil has been damaged as the result of cultivation or overgrazing. From ⅓ to ⅔ of the original surface soil is gone. The soil should be used for renovated pasture, for hay crops, or for trees. Careful management is required to prevent further erosion and lowering of the moisture-holding capacity. (Capability unit VIs–1.)

Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded (HfE3).—Most of this soil is in long, narrow strips between areas of Stony rock land and the valleys phases of the Fayette soils. Much of the soil has lost nearly all of its original surface layer. Part of the subsoil has been mixed with the remaining surface layer by plowing. As a result, the present surface layer is yellowish brown. This soil is low in organic matter and plant nutrients.

Areas of this soil that are not already in forage crops, trees, or other permanent vegetation should be seeded to pasture or hay crops or planted to trees. Grazing needs to be controlled in pastured areas. Wooded areas need protection from fire and from grazing by livestock. (Capability unit VIIs–1.)

Hixton fine sandy loam, 20 to 30 percent slopes (HfF).—This soil generally is on valley slopes just below areas of Stony rock land. It has a thinner solum than Hixton fine sandy loam, 10 to 15 percent slopes, but the two soils are otherwise similar. Depth to the sandy substratum is generally less than 20 inches.

This soil is not suited to cultivated crops. Most of it is in pasture or trees and should be kept in such uses. Pastured areas require careful management to prevent damage as the result of overgrazing. Forested areas need protection from fire and should be fenced to keep livestock out. (Capability unit VIIs–1.)

Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded (HfF2).—This soil has lost about one-half of its original surface layer through water erosion. It can be used and managed about the same as Hixton fine sandy loam, 20 to 30 percent slopes, but it requires more intensive management to prevent further erosion. Also, desirable kinds of trees are harder to establish on this soil. (Capability unit VIIs–1.)

Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded (HfF3).—This soil has lost most of its original surface layer through erosion. Otherwise, it is similar to Hixton fine sandy loam, 20 to 30 percent slopes. The soil is low in organic matter and plant nutrients. In a few small areas, the surface layer has a loamy texture.

Because of the strong slopes, grass is difficult to establish on this soil, and the areas should probably be replanted to trees. Desirable kinds of trees are harder to grow on this soil, however, than on Hixton fine sandy loam, 20 to 30 percent slopes. If a stand of trees is established, protection is needed from fire and from grazing by livestock. (Capability unit VIIs–1.)

Hixton fine sandy loam, 30 to 45 percent slopes (HfG).—This soil is similar to Hixton fine sandy loam, 20 to 30 percent slopes, but it has stronger slopes and in some small areas the soil is very shallow over bedrock. Most of the soil is in forest and should not be cleared. The trees require protection from fire and from grazing by livestock. Selective cutting will help to obtain high yields of forest products. (Capability unit VIIs–1.)

Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded (HfG2).—In most places this soil has lost from ⅓ to ⅔ of its original surface soil through erosion. In a few places nearly all of the surface soil is gone. The soil needs a protective cover of plants to help prevent further erosion and should be replanted to trees. Desirable kinds of trees are harder to establish on this soil, however, than on Hixton fine sandy loam, 30 to 45 percent slopes. (Capability unit VIIs–1.)

Jackson Series

The Jackson series is made up of deep, silty soils that are moderately well drained. The soils are on stream terraces. They are nearly level to sloping, but most of them have slopes of less than 6 percent. The soils have formed in a layer of silt, 42 or more inches thick, that was laid down by water.

These soils are near the Bertrand and Curran soils. Typically, they have a dark grayish-brown surface layer. Their subsoil is brown silty clay loam, and their substratum is yellowish-brown silt overlying stratified sand.

The natural fertility of these soils is moderately high. Permeability is moderate, but the moisture-supplying capacity is high. The soils are slightly acid to strongly acid.

Jackson silt loam, 0 to 2 percent slopes (JaA).—Most of this soil occurs in fairly small areas that are scattered along the valleys of the major streams. In places runoff and seepage from the adjoining upland soils cause excessive wetness. The following describes a typical profile:

A 0 to 9 inches, dark grayish-brown silt loam; moderate, fine, granular structure; friable; roots abundant; pH 6.5.
9 to 13 inches, dark grayish-brown silt loam; moderate, thin, platy structure; friable; roots plentiful; pH 6.5.

B 13 to 39 inches, brown to dark-brown silty clay loam; moderate, medium, subangular blocky structure; firm; clay skins on the faces of peds; a few manganese concretions; many, coarse, distinct mottles of strong brown and pinkish gray at depths below 18 inches, and more highly mottled with increasing depth; pH 5.5.
C 39 inches +, yellowish-brown silt loam; massive; friable; pH 5.0.

This soil has only a slight hazard of erosion. Consequently, practices to control erosion are not needed if the soil is well managed otherwise. The soil seldom requires drainage before alfalfa can be grown.

This soil is well suited to corn, small grains, and forage crops, and the crops make high yields. If a suitable cropping system is used and an adequate supply of plant nutrients is maintained, the soil can be cropped intensively. The crops respond well if a complete fertilizer is added, but corn requires supplemental applications of nitrogen. Lime is needed for high yields of legumes. The lime should be applied according to the needs indicated by soil tests. (Capability unit I–1.)

Jackson silt loam, 2 to 6 percent slopes (JaB).—This soil has a moderate hazard of erosion. If an adequate supply of plant nutrients is maintained and fairly simple practices are used to prevent further erosion, the soil can be cropped intensively. The crops respond well if a complete fertilizer and manure are added. In many places, however, yields of corn are low because the soil needs organic matter and nitrogen. The soil requires enough lime to raise the pH to 6.5 or 7.0. (Capability unit IIe–1.)

Jackson silt loam, 2 to 6 percent slopes, moderately eroded (JaB2).—This soil has lost from ⅓ to ⅔ of its original surface soil through erosion. As a result, it requires larger amounts of a complete fertilizer and manure for yields that are comparable to those obtained on Jackson silt loam, 2 to 6 percent slopes. In addition, more careful management is required to prevent further erosion. Diversion ditches should be used on adjoining areas to keep the runoff from flowing over this soil. (Capability unit IIe–1.)

Jackson silt loam, 6 to 10 percent slopes, moderately eroded (JaC2).—In most places this soil has lost from ⅓ to ½ of its original surface soil. When it is plowed, part of the brown subsoil is turned up in many places.

Because of the strong slopes and hazard of erosion, this soil should not be cropped intensively. It generally occurs in small areas. Consequently, the practices that are required to control erosion are similar to those used on adjoining soils. To maintain productivity, the soil requires a suitable cropping system. Also, the supply of plant nutrients needs to be maintained. (Capability unit IIIe–1.)

Judson Series

The soils of the Judson series are well drained to moderately well drained but are flooded occasionally by runoff from higher lying areas. They have formed under grass in local alluvium. The alluvium, which is more than 42 inches thick, was washed down by water or was brought down by gravity from the steeper slopes above. The soils occur at the heads of draws; along the bottoms of small, intermittent streams; and at the foot of steep hills. They have slopes of as much as 10 percent.

Generally, the texture of the Judson soils is silt loam throughout. The soils are similar to the Chaseburg soils and occur in similar positions. The Judson soils, however, have a darker colored surface layer and subsoil. The surface layer is very dark gray, the subsoil is dark gray to brown, and the substratum is dark brown.

These soils have high natural fertility and moisture-supplying capacity. They are normally slightly acid.

Judson silt loam, 0 to 3 percent slopes (JuA).—This nearly level soil is one of the most productive soils in the county. The following describes a typical profile:

A 0 to 18 inches, very dark gray silt loam; moderate, medium, granular structure; friable; contains many roots and a few stones; pH 7.0.
B 18 to 44 inches, very dark gray to very dark brown silt loam; weak, fine, subangular blocky structure; friable; several wormcasts; a few fragments of sandstone; roots plentiful; pH 7.0.
C 44 inches +, dark-brown silt loam; massive; friable; pH 6.5.

In a few places there is a thin deposit of sandy material on the surface of this soil. These areas were too small to map separately.

Judson silt loam, 0 to 3 percent slopes, is well suited to all the crops commonly grown in the county. It can be cropped intensively, and, under good management, yields are high. The small, sandy areas can be used and managed the same as the rest of the soil, but the wet areas require special management.

If this soil is cultivated, a suitable cropping system should be used and an adequate supply of plant nutrients maintained. Areas likely to be damaged by floods need to be protected by dikes or to be kept in pasture or hay crops. Forage crops respond well if a complete fertilizer is applied periodically. (Capability unit IIw–11.)

Judson silt loam, 3 to 10 percent slopes (JuB).—This soil is similar to Judson silt loam, 0 to 3 percent slopes, but it has stronger slopes and a slight to moderate hazard of erosion. In a few places nearly two-thirds of the surface layer is gone. Also, the areas are likely to be flooded.

This soil requires protection from flooding and from erosion. It should not be used quite so intensively as Judson silt loam, 0 to 3 percent slopes. Nevertheless, yields are high if an adequate supply of plant nutrients is maintained and a suitable cropping system is used. (Capability unit IIw–11.)

Lamont Series

The Lamont soils are sandy and are somewhat excessively drained. They have formed under a cover of hardwoods on high bluffs that border the Mississippi and Wisconsin Rivers. The soils occur in dunelike areas where much crossbedding and wind stratification have occurred. They generally are within 2 or 3 miles of the river bluffs. These soils have formed in parent material that is sandy but that grades to silt similar to that in nearby deposits of loess. In some places they are nearly level, but in others they have slopes of as much as 45 percent.

These soils occur near the Chelsea and Seaton soils. Their surface layer is dark-brown fine sandy loam. The

subsoil is dark brown and ranges in texture from very fine sandy loam to sandy clay loam. The substratum is brown and sandy. In many places the soils are calcareous at depths of 6 to 8 feet and are underlain by loamy sand or very fine sandy loam.

The natural fertility of these soils is moderate, but the content of organic matter is low. Permeability is moderate to rapid, and the moisture-supplying capacity is moderately low. The upper part of the profile is slightly acid to medium acid. The hazard of erosion is severe; gullies form easily and cut quickly and deeply into the soils.

Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded (LaB2).—Most of this soil is on the bluffs along the western edge of the county. The following describes a profile in a virgin soil:

A 0 to 7 inches, dark-brown fine sandy loam; weak, fine, subangular blocky structure; very friable; roots plentiful; a few earthworm casts; pH 6.5.
7 to 15 inches, dark grayish-brown loamy fine sand; weak, thick, platy structure; very friable; roots plentiful; pH 6.5.
B 15 to 23 inches, dark-brown fine sandy loam; weak, medium, subangular blocky structure; very friable; roots plentiful; pH 5.8.
23 to 45 inches, dark-brown very fine sandy loam; moderate, medium, subangular blocky structure; friable; a few plant roots; pH 6.0.
C 45 inches +, dark-brown to brown loamy fine sand; single grain; loose; some wind stratification; pH 7.0.

Most of this soil has been cultivated. As a result, most of it has lost from 5 to 10 inches of the original surface layer. In areas that have not been cultivated, the soil is not eroded.

Because of the serious hazard of erosion, this soil is not well suited to row crops grown oftener than 1 year out of 4 unless supporting practices are used to prevent further erosion. Crops on this soil respond well if a complete fertilizer high in nitrogen is applied. If an adequate supply of plant nutrients and organic matter is maintained, corn and forage crops make moderate yields. Alfalfa grows fairly well if lime is added. (Capability unit IIIs–2.)

Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded (LaD2).—This soil is similar to Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded, but it has a slightly thinner, lighter colored surface layer that ranges from fine sandy loam to loamy fine sand in texture. Also, the underlying substratum is more sandy and is at depths of less than 36 inches; the hazard of erosion is more serious; and the soil is slightly more droughty.

This soil is better suited to forage crops or to fruit or forest trees than to cultivated crops. Because of the strong slopes, cultivating the soil is likely to cause it to erode. Nevertheless, if adequate practices are applied to control erosion, cultivated crops can be grown 1 year out of 4. If this soil is used for hay crops or pasture, the areas need to be renovated periodically. (Capability unit IVe–7.)

Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded (LaD3).—This soil is similar to Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded, but it has lost more of the original surface soil through erosion. In many places there are shallow gullies. The soil should be kept in permanent vegetation to prevent further gullying. If it is used for pastures, the pastures need to be renovated and grazing controlled. Areas that are planted to trees need protection from fire and from grazing by livestock. (Capability unit IVe–7.)

Lamont fine sandy loam, 15 to 20 percent slopes (LaE).—This soil is similar to Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded. Most of it, however, has never been cultivated. The areas are fairly small.

This soil is better suited to pasture and forest than to cultivated crops. In the pastured areas grazing needs to be controlled to help prevent erosion. If feasible, pastured areas should be renovated, but the strong slopes make renovation difficult in some places. Forested areas require protection from fire and need to be fenced to prevent grazing by livestock. (Capability unit IVe–7.)

Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded (LaE2).—In many areas of this soil, erosion has exposed the loamy fine sand in the lower part of the surface layer and the present surface layer is fairly sandy. Some small areas are severely eroded and are cut by gullies.

This soil should be kept in pasture, trees, or other permanent vegetation to prevent further damage by erosion. It can be used and managed about the same as Lamont fine sandy loam, 15 to 20 percent slopes. In addition to controlling grazing in the pastured areas, it is necessary to keep livestock entirely out of some pastures until the sod is well established. (Capability unit IVe–7.)

Lamont fine sandy loam, 20 to 45 percent slopes (LaF).—Rapid runoff and droughtiness make this soil poorly suited to pasture. Much of the soil has been kept in forest. It is better suited to that use than to pasture or cultivated crops. Selective cuttting of the trees in forested areas will encourage the more desirable ones to grow and to make better yields. The trees should be protected from fire and from grazing by livestock. (Capability unit VIs–1.)

Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded (LaF2).—This soil is made up of both moderately and severely eroded areas. In many places gullies occur.

If feasible, this soil should be replanted to trees. Pastures will produce a limited amount of forage, but grazing must be controlled carefully to prevent further erosion. Trampling by livestock has caused gullies to start in some pasture lanes. The lanes need to be relocated and the eroded areas reseeded. Forested areas require protection from fire and from grazing by livestock. (Capability unit VIs–1.)

Lindstrom Series

The Lindstrom series consists of deep, silty soils that are well drained. These soils are on concave valley slopes below areas of Stony rock land. They have formed under prairie in loess and local alluvium that was washed mainly from loess, but partly from drift and from materials weathered from sandstone and limestone. The deposits are more than 42 inches thick.

These inextensive soils are near the valleys soils of the Fayette series. They are similar to those soils, but the Fayette soils have formed under forest. Typically, the Lindstrom soils have a small amount of grit throughout the profile. In a few places boulders occur on the surface and in the profile. The surface layer of these soils is very dark brown silt loam. The subsoil is dark-brown, light silty clay loam, and the substratum is yellowish brown and silty.

The natural fertility of these soils is moderately high. Permeability is moderate, and the moisture-supplying capacity is high. The soils are slightly acid. They are likely to be eroded by water, particularly if the slopes are long and steep.

Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded (LnC2).—This soil occurs in small areas scattered throughout the county. In most places it has lost from ⅓ to ⅔ of its original surface soil. In a few small areas the soil is only slightly eroded, and in a few areas it is severely eroded and small patches of subsoil have been exposed by plowing. The soil otherwise has a profile similar to the following profile, which is in an area that is not eroded:

A 0 to 12 inches, very dark brown silt loam; moderate, medium, granular structure; friable; roots abundant; pH 6.5.

B 12 to 17 inches, dark-brown silt loam; moderate, medium, subangular blocky structure; friable; many earthworm holes and casts; highly vesicular; roots plentiful; pH 6.5.

17 to 42 inches, dark yellowish-brown silty clay loam that grades to dark-brown silty clay loam in lower part; moderate, medium, subangular blocky structure; firm; roots plentiful; a few fragments of sandstone; pH 6.5.

C 42 inches +, dark yellowish-brown silt loam; massive; friable; pH 6.5.

This soil is well suited to corn, small grains, and forage crops. Because it occurs in small areas, however, it is farmed the same as adjoining soils. Row crops should be grown no oftener than 1 year out of 4 on this soil unless supporting practices are applied to prevent further erosion. To maintain satisfactory yields, a suitable cropping system is also required and the supply of plant nutrients should be maintained. Crops respond well if a complete fertilizer is applied and manure is added. (Capability unit IIIe–1.)

Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded (LnE2).—This soil is similar to Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded, but it has stronger slopes and the hazard of erosion is slightly more serious. A few small areas are severely eroded.

This soil can be used and managed about the same as Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded, but it requires more intensive use of practices to control erosion. In the severely eroded areas, larger amounts of a complete fertilizer and manure will be needed to obtain yields comparable to those produced on the less eroded areas. (Capability unit IVe–1.)

Marsh

Marsh (Ma).—This miscellaneous land type is nearly level and consists of a mixture of wet alluvial soils. In many places there are small areas of organic soils or areas made up of a mixture of organic and mineral materials. The areas are on stream bottom lands where they are covered by floodwaters during most of the year. The natural vegetation is mostly swamp grasses and reeds but includes a scattering of willow, black ash, swamp birch, and other trees that tolerate water.

This land type is made up of soils that have a dark-colored surface layer and a grayish subsoil and substratum. It has a water table that is permanently high and a high moisture-supplying capacity. Natural fertility ranges from moderate to high. The soils are slightly acid to neutral.

Marsh is not suited to cultivation and provides poor yields of pasture. In most places it occurs in positions that are too low in relation to the streams to permit drainage. Nevertheless, if the areas are drained and cleared, moderate to high yields of pasture are obtained. The pastures respond well if a complete fertilizer that is high in nitrogen is applied. Except for streambank cutting, erosion is not a hazard. Use of structures to protect the areas from streambank cutting is generally not feasible. (Capability unit VIIIw–1.)

Medary Series

The Medary series is made up of deep, silty and clayey soils that are moderately well drained. The soils are on high terraces along the Mississippi River and its tributaries. They have slopes ranging from 0 to 15 percent, but in most places the slopes are less than 6 percent. These soils are mainly along the Grant and Platte Rivers near the places where these rivers join the Mississippi River. They have formed under hardwoods in lake-laid deposits of silt and clay. The deposits are 42 or more inches thick.

The surface layer of these soils is dark grayish-brown silt loam. The subsoil is dark reddish-brown silty clay, and the substratum is reddish-brown silty clay. Sandy layers occur in the substratum in most places.

The natural fertility of these soils is moderate. Permeability is slow, and the moisture-holding capacity is high. The upper part of the profile is normally medium acid to slightly acid, but liming for the growing of legumes has raised the pH to approximately neutral. The soils are likely to erode, particularly if they have strong slopes.

Medary silt loam, 0 to 2 percent slopes (MdA).—This soil is inextensive and occurs in small areas. The following describes a typical profile:

A 0 to 9 inches, dark grayish-brown silt loam; moderate, medium, granular structure; friable; roots abundant; pH 7.0.

9 to 14 inches, dark-brown silt loam; moderate, medium, platy structure; friable; roots plentiful; pH 6.5.

B 14 to 36 inches, dark reddish-brown silty clay; moderate to strong, fine, angular blocky structure with clay skins on the surfaces of the peds; hard when dry, but plastic when wet; many, medium, distinct mottles of pinkish gray and yellowish red in the lower part; pH 6.0.

C 36 inches +, reddish-brown silty clay; massive; hard when dry, but plastic when wet; thin lenses of fine sandy loam occur at depths below 40 inches; has some lime concretions; pH 7.0.

This soil can be cultivated fairly intensively and is well suited to most of the crops commonly grown in the county.

It has only a slight hazard of erosion. If well managed otherwise, it needs no special practices to control erosion.

If an adequate supply of plant nutrients and organic matter is maintained, crops make high yields on this soil. Deep-rooted legumes, included in the rotation, will help to improve the aeration and internal drainage. Crops on this soil respond well if lime and a complete fertilizer are applied and manure is added. Corn and oats need a supplemental nitrogen fertilizer for high yields, and lime is required to establish legumes. The lime should be applied according to the needs indicated by soil tests. (Capability unit IIe–6.)

Medary silt loam, 2 to 6 percent slopes, moderately eroded (MdB2).—This soil has a thinner surface layer than Medary silt loam, 0 to 2 percent slopes, and the surface layer is slightly lower in organic matter. From ⅓ to ⅔ of the original surface soil has been lost through water erosion. A few small areas are more seriously eroded. In these more seriously eroded areas, part of the subsoil has been mixed with the remaining surface soil. As a result, the present surface layer is dark reddish brown and has a heavier texture than the original one.

This soil can be used and managed about the same as Medary silt loam, 0 to 2 percent slopes. More careful management is needed, however, to prevent further erosion. If satisfactory yields are to be obtained, the severely eroded areas also require larger amounts of a complete fertilizer and manure than the less eroded areas. (Capability unit IIe–6.)

Medary silt loam, 6 to 10 percent slopes, moderately eroded (MdC2).—This soil is similar to Medary silt loam, 2 to 6 percent slopes, moderately eroded, but it has stronger slopes and a more serious hazard of erosion. In many places small patches of the dark reddish-brown subsoil have been exposed as the result of water erosion.

This soil cannot be used so intensively as Medary silt loam, 2 to 6 percent slopes, moderately eroded. Row crops should be grown no oftener than 1 year out of 4 unless supporting practices are used to prevent further erosion. The crops make higher yields if a complete fertilizer is added, but corn and oats also require supplemental applications of a nitrogen fertilizer. Adding organic matter will help to make the soil more permeable to water, more friable, and easier to till. (Capability unit IIIe–1.)

Medary silt loam, 10 to 15 percent slopes, moderately eroded (MdD2).—This soil is similar to Medary silt loam, 6 to 10 percent slopes, moderately eroded, but it has stronger slopes. Some small areas have lost nearly all of their original surface soil through water erosion.

Because of the serious hazard of erosion, this soil is best kept in grasses and legumes as much of the time as feasible. If an adequate supply of plant nutrients is maintained and erosion is controlled, row crops can be grown 1 year out of 4. Forage crops grow well on this soil, but they require fertilizer and lime. Except for occasional renovation, the severely eroded areas should be kept in permanent vegetation. (Capability unit IIIe–1.)

Medary soils, 6 to 10 percent slopes, severely eroded (MeC3).—More than two-thirds of the surface layer of these soils has been removed through water erosion, and in many places part of the reddish-brown subsoil is gone. In many places large patches of the subsoil have been exposed. The present surface layer is finer textured and more difficult to work with farm implements than the original surface layer.

These soils are best suited to hay crops and pasture. Periodic renovation is required to maintain satisfactory yields. (Capability unit IVe–1.)

Meridian Series

The soils of the Meridian series are well drained. They occur mainly on terraces along the larger streams in the county. These soils have formed in sandy parent material that was laid down by water. They are underlain by sandy outwash at depths of 24 to 36 inches.

These soils are near the Dakota soils. Unlike the Dakota soils, however, they have formed under a cover of hardwoods. Typically, their surface layer is dark-brown loam or fine sandy loam. Their subsoil is dark-brown sandy clay loam or loam, and their substratum is yellowish-brown fine sand.

The natural fertility of these soils is high. Permeability is moderate to moderately rapid, and the moisture-supplying capacity is moderate to moderately low. The soils vary from slightly acid to strongly acid.

Meridian loam, 0 to 2 percent slopes (MmA).—This soil occupies fairly large areas near soils of the Dakota series. The following describes a typical profile:

A 0 to 8 inches, dark-brown loam; moderate, fine, granular structure; friable; roots plentiful; pH 6.5.
8 to 12 inches, brown fine sandy loam; weak, medium, platy structure; very friable; many earthworm holes and casts; roots plentiful; pH 6.2.
B 12 to 30 inches, dark-brown sandy clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; pH 5.5.
C 30 inches +, yellowish-brown fine sand; single grain; loose; stratified; in many places has thin bands of dark-brown sandy loam less than 1 inch thick; pH 6.5.

This soil requires no special practices to control erosion if it is well managed otherwise. If a suitable cropping system is used and an adequate supply of plant nutrients is maintained, the soil can be used fairly intensively. All of the crops commonly grown in the county can be grown, and high yields are obtained. Corn and second cuttings of hay crops may be damaged during extended dry periods, however, by lack of moisture.

Crops on this soil respond well if lime and a complete fertilizer are applied and manure is added. To obtain high yields of legumes, enough lime is required to raise the pH to 6.5. In many places nitrogen and potash are needed to get high yields of corn and small grains. (Capability unit IIs–1.)

Meridian loam, 2 to 6 percent slopes (MmB).—This soil is similar to Meridian loam, 0 to 2 percent slopes, but it has stronger slopes and a slight to moderate hazard of erosion. The two soils can be used about the same. This soil, however, requires more intensive management to prevent erosion and the resultant lowering of moisture-holding capacity and yields. The areas that have long slopes are well suited to contour stripcropping and terracing. (Capability unit IIs–1.)

Meridian loam, 2 to 6 percent slopes, moderately eroded (MmB2).—This soil has a thinner surface layer and subsoil than Meridian loam, 0 to 2 percent slopes. The

substratum is at depths of 24 to 30 inches. From ⅓ to ⅔ of the original surface layer has been lost through water erosion. A few small areas have lost more than two-thirds of their original surface layer.

Because of its strong slopes and the hazard of erosion, this soil should not be cultivated intensively. Unless supporting practices are applied to control erosion, row crops should be grown no oftener than 1 year out of 4. Otherwise, management is about the same as that of the uneroded Meridian loam that has similar slopes. (Capability unit IIs–1.)

Meridian loam, 6 to 10 percent slopes, moderately eroded (MmC2).—This soil has stronger slopes and a thinner surface layer than Meridian loam, 0 to 2 percent slopes. Otherwise, the two soils are similar. From ⅓ to ⅔ of the original surface layer has been lost through erosion. A few small areas have lost more than two-thirds of their original surface layer.

Because this soil is likely to erode, it should not be cultivated intensively. Row crops should be grown no oftener than 1 year out of 5, unless supporting practices are applied to prevent further erosion. (Capability unit IIIs–2.)

Meridian loam, 10 to 15 percent slopes, moderately eroded (MmD2).—Much of this soil occurs in small, narrow areas on terrace breaks that are hard to farm. The soil is likely to erode and is not suited to intensive cropping.

This soil is better used for hay crops or pasture than for cultivated crops. Yields are fairly high if an adequate supply of plant nutrients is maintained and the content of organic matter is built up. Renovating the areas once in 5 years will help to maintain satisfactory yields. Trees planted on this soil require protection from fire and from grazing by livestock. (Capability unit IIIs–2.)

Meridian fine sandy loam, 0 to 2 percent slopes (MfA).—This soil occupies fairly large areas near the Dakota fine sandy loams. Its surface layer and subsoil are coarser textured than those of Meridian loam, 0 to 2 percent slopes. Also, the subsoil is more friable and the depth to the underlying substratum is slightly shallower. Generally, the fine sandy substratum is at depths ranging from 24 to 30 inches. The following describes a typical profile:

A 0 to 8 inches, dark-brown fine sandy loam; weak, fine, granular structure; very friable; roots plentiful; pH 6.5.
8 to 11 inches, dark-brown fine sandy loam; weak, medium, platy structure; very friable; a few earthworm casts in the upper part; roots plentiful; pH 6.2.
B 11 to 28 inches, dark-brown loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 5.5.
C 28 inches +, yellowish-brown fine sand; single grain; loose; stratified and contains thin layers or lenses of dark-brown sandy loam; pH 6.2.

This soil has a moderate hazard of wind erosion. The supply of plant nutrients is lower than in Meridian loam, 0 to 2 percent slopes, and the soil contains less organic matter. Also, this soil is droughtier. It cannot be cropped so intensively as Meridian loam, 0 to 2 percent slopes, unless suitable practices are applied to conserve soil and moisture.

Corn on this soil is likely to be damaged by drought. Small grains, soybeans, and hay crops make fairly high yields if an adequate supply of plant nutrients is maintained. The soil is acid in many places and requires lime for high yields. Some areas, however, have been limed, or enough road dust that is high in lime has been blown onto them to make the soil neutral in reaction. In many places yields are low because the soil needs nitrogen and organic matter. Applications of a nitrogen fertilizer should be balanced with applications of phosphate and potash. (Capability unit IIIs–2.)

Meridian fine sandy loam, 2 to 6 percent slopes (MfB).—The profile of this soil is similar to that described for Meridian fine sandy loam, 0 to 2 percent slopes. The two soils can be used and managed about the same. This soil, however, is likely to be eroded by water as well as wind. Consequently, it requires more careful management to prevent erosion and lowering of the moisture-supplying capacity. (Capability unit IIIs–2.)

Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded (MfB2).—This soil has a thinner surface layer than Meridian fine sandy loam, 2 to 6 percent slopes. From ⅓ to ⅔ of the original surface soil has been lost through erosion. In a few small areas, nearly all of the surface soil is gone. The soil requires practices to prevent further erosion. Larger amounts of fertilizer and manure are needed to obtain comparable yields than are needed on Meridian fine sandy loam, 2 to 6 percent slopes. (Capability unit IIIs–2.)

Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded (MfC2).—This soil is similar to Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded, but it has stronger slopes and a greater hazard of water erosion. Row crops should be grown no oftener than 1 year out of 6, unless practices are applied to prevent further erosion. Crops on this soil respond well if large amounts of fertilizer and manure are added. (Capability unit IVs–2.)

Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded (MfC3).—This soil is not extensive. Its surface layer is thinner than that of Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded. This soil is also more droughty and is less suited to cultivation. Most of the surface layer has been removed as the result of water erosion, and in some areas part of the subsoil has been lost.

This soil is not suited to row crops but is better used to grow forage crops or trees. If it is used for forage crops, the areas require renovating to obtain satisfactory yields. (Capability unit VIs–1.)

Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded (MfD2).—Much of this soil is in small areas on terrace breaks that are hard to farm. The soil has stronger slopes and a more severe hazard of erosion than Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded. Also, it is droughtier and is shallower over stratified sand.

This soil is better suited to pasture and hay crops or trees than to cultivated crops. In midsummer, second cuttings of hay and yields of pasture are often lowered by drought. If the soil is used for pasture and hay crops, the areas will need to be renovated. The trees in wooded areas need protection from fire and from grazing by livestock. (Capability unit IVs–2.)

Muscatine Series

The soils of the Muscatine series are deep and silty and are somewhat poorly drained. They have formed on uplands under prairie. Most of the soils are on broad ridges and have slopes of 2 percent or less, but the slopes range from 0 to 6 percent.

These soils are near soils of the Atterberry and Tama series. Typically, their surface layer is black to very dark gray silt loam. Their subsoil is brown silty clay loam, and their substratum is yellowish-brown, heavy silt loam. In most places the soils are underlain by Maquoketa shale at depths of 10 feet or more.

These soils have high natural fertility and are high in moisture-holding capacity. They have moderate permeability and are normally medium acid. In Grant County some areas that are moderately well drained are included with the Muscatine soils.

Muscatine silt loam, 0 to 2 percent slopes (MuA).—Most of this soil is in the southeastern part of the county. The following describes a typical profile:

A 0 to 14 inches, black to very dark gray silt loam; moderate, medium, granular structure; friable; roots abundant; very high content of organic matter; pH 6.8.

B 14 to 32 inches, dark grayish-brown to brown silty clay loam; moderate, medium, subangular blocky structure; firm when moist, but slightly plastic when wet; roots plentiful; in the lower part there are mottles of yellowish brown and gray; pH 5.7.

C 32 inches +, yellowish-brown, heavy silt loam; massive; friable; in places calcareous at depths of 7 feet or more; pH 6.8.

This soil is one of the most productive in the county. It is suited to all of the crops commonly grown in the county, and high yields are obtained. The soils can be cropped intensively if an adequate supply of plant nutrients is maintained and a suitable cropping system is used. In a few low, wet areas, drainage is required before alfalfa can be grown. In some places moderate amounts of lime are needed for high yields of legumes. (Capability unit I–1.)

Muscatine silt loam, 2 to 6 percent slopes (MuB).—This soil is similar to Muscatine silt loam, 0 to 2 percent slopes, but it has stronger slopes and a slight to moderate hazard of erosion. Unless it is managed carefully, it should be used less intensively. Nevertheless, if contour stripcropping, terracing, and other practices are used to prevent erosion, this soil can be cropped as intensively as Muscatine silt loam, 0 to 2 percent slopes. (Capability unit IIe–1.)

Muscatine silt loam, 2 to 6 percent slopes, moderately eroded (MuB2).—This soil has lost from 4 to 8 inches of its original surface soil through water erosion. Further erosion will cause the plow layer to become less friable, tilth to be poorer, and yields to decline.

This soil can be used and managed about the same as Muscatine silt loam, 2 to 6 percent slopes. Larger amounts of fertilizer and manure are required, however, to build up the supply of plant nutrients and organic matter. (Capability unit IIe–1.)

Orion Series

The Orion soils are somewhat poorly drained and occur in stream valleys where they are likely to be flooded. They have formed in silty alluvial material washed from loess-covered uplands and terraces.

These soils occur near the Arenzville soils but at slightly lower elevations. Their natural fertility is moderate. The moisture-holding capacity is high, and the soils are neutral. Only one soil of this series—Orion silt loam—is mapped in this county.

Orion silt loam (Or).—This soil occurs in small areas throughout the county, but most of it is along the main rivers. The following describes a profile in Marion Township:

A 0 to 7 inches, dark grayish-brown silt loam; weak, fine, granular structure; friable; roots plentiful; pH 7.0.

7 to 14 inches, dark grayish-brown to dark-gray silt loam that is slightly mottled with gray and yellowish brown; thin seams of very fine sand; weak, thick, platy structure; friable; roots plentiful; pH 7.0.

14 inches +, dark gray to very dark gray silt loam that is mottled with yellowish brown and dark reddish brown; massive; friable; weakly stratified and contains a few iron and manganese concretions; pH 7.0.

Areas of this soil that have been cleared are used for row crops and permanent pasture. The soil is well suited to corn. It is also well suited to small grains, hay crops, and pasture. Yields are moderate to high, but, unless the cultivated areas are protected from flooding, floodwaters sometimes destroy the crops. Alfalfa cannot be grown unless the soil is adequately drained and protected from floods. Crops respond well to a complete fertilizer. Corn needs supplemental applications of nitrogen. Generally, lime is not needed. (Capability unit IIIw–14.)

Richwood Series

The Richwood soils are deep and silty and are well drained. They are on high stream terraces and have slopes ranging from 0 to 6 percent. The soils have formed under prairie in water-laid silt that is more than 42 inches thick.

These soils occur near Bertrand and Toddville soils. Typically, they have a thick, black, silty surface layer, and their subsoil is dark-brown silty clay loam. They have a yellowish-brown, silty substratum. In many places stratified sand occurs in the substratum at depths below 42 inches.

The natural fertility of these soils is high. The soils are moderate in permeability and have high moisture-supplying capacity. They are normally medium acid.

Richwood silt loam, 0 to 2 percent slopes (RcA).—This soil is not extensive in this county, but it generally occurs in areas that are more than 10 acres in size. The following describes a typical profile:

A 0 to 12 inches, black silt loam; moderate, medium, granular structure; friable; roots abundant; some earthworm casts; pH 6.8.

12 to 17 inches, very dark grayish-brown silt loam; moderate, medium, platy structure; friable; roots plentiful; pH 6.8.

B 17 to 37 inches, dark-brown silty clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; pH 6.0.

C 37 inches +, dark yellowish-brown silt loam; massive; friable; grades to stratified fine sand at depths below 42 inches; pH 6.0.

If this soil is well managed otherwise, no special practices are required to control erosion. The soil can be

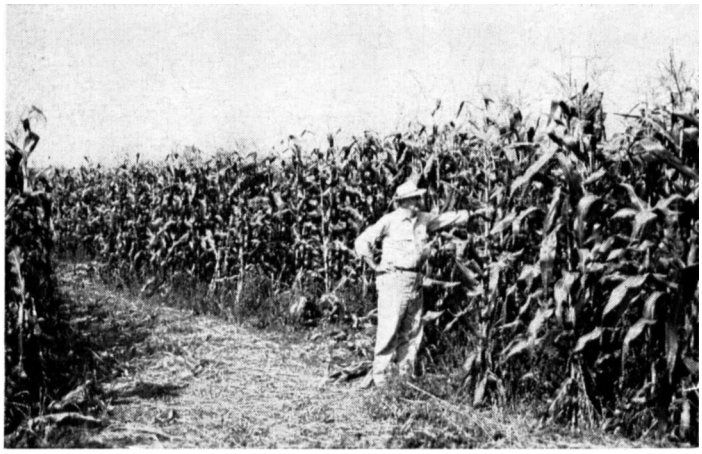

Figure 9.—**Corn growing on Richwood silt loam, 0 to 2 percent slopes. (Photo by F. D. Hole, Soil Survey Division, University of Wisconsin.)**

farmed intensively. Yields will be high if an adequate supply of plant nutrients is maintained and there is adequate organic matter.

Crops on this soil respond well if a fertilizer high in phosphate and potash is added. Corn, however, also requires supplemental applications of a nitrogen fertilizer for high yields. Figure 9 shows corn growing on this soil. Lime is needed for high yields of legumes. The lime should be applied according to the needs indicated by soil tests. (Capability unit I–1.)

Richwood silt loam, 2 to 6 percent slopes (RcB).—This soil is similar to Richwood silt loam, 0 to 2 percent slopes. Because of its stronger slopes, however, it has a slight hazard of erosion. If practices are applied to control erosion, this soil can be used as intensively as Richwood silt loam, 0 to 2 percent slopes. (Capability unit IIe–1.)

Rozetta Series

The Rozetta series is made up of deep, silty soils that are moderately well drained. These soils occur in scattered areas near the heads of drainageways that cut through the uplands. Most of the areas are fairly small. The soils have slopes ranging from 6 to 10 percent. They have formed under forest in deposits of silt that are more than 42 inches thick. The silt was blown onto the ridgetops by winds during or just after glacial times. Limestone or sandstone bedrock underlies the silt.

These soils are near areas of the Fayette uplands soils. The parent material from which they formed is similar to that of the Fayette and Stronghurst soils, but the Rozetta soils are intermediate in drainage between those soils. They have a dark grayish-brown, silty surface layer. Their subsoil is mottled, brown silty clay loam. They have a mottled, brown, silty substratum.

The natural fertility of these soils is moderately high. Permeability is moderate, and the moisture-supplying capacity is high. The soils are normally slightly acid to medium acid.

Rozetta silt loam, 6 to 10 percent slopes (RoC).—This soil is easy to cultivate and manage, but it has a moderate hazard of erosion. The following describes a typical profile in a field that has been limed:

A 0 to 8 inches, dark grayish-brown silt loam; moderate, fine to medium, granular blocky structure; friable; many earthworm casts; roots plentiful; pH 7.5.
8 to 12 inches, dark grayish-brown silt loam; moderate, thin, platy structure; friable; slightly vesicular; many earthworm holes and casts; roots plentiful; pH 7.0.
B 12 to 18 inches, dark-brown, light silty clay loam; moderate, medium, subangular blocky structure; firm; slightly vesicular; roots plentiful; pH 6.5.
18 to 32 inches, brown silty clay loam with many, medium, distinct mottles of strong brown and dark brown; moderate, medium, angular blocky structure; firm; roots plentiful; pH 5.7.
32 to 38 inches, brown, heavy silt loam with many, medium, distinct strong-brown and dark-brown mottles; moderate, medium, subangular blocky structure; firm; a few roots; pH 5.5.
C 38 inches +, brown silt loam; massive; friable; pH 5.5; limestone bedrock at depths of 7 feet.

This soil is well suited to all the crops commonly grown in the county. It can be cropped fairly intensively if supporting practices are used to prevent erosion and if the soil is well managed otherwise. If an adequate supply of plant nutrients is maintained, yields are high.

Crops on this soil respond well if a complete fertilizer is applied and manure is added. Corn and small grains, however, also need supplemental applications of a nitrogen fertilizer for high yields. Areas that have not been limed require enough lime to raise the pH to 6.5 or 7.0. (Capability unit IIIe–1.)

Rozetta silt loam, 6 to 10 percent slopes, moderately eroded (RoC2).—This soil is lower in fertility and contains less organic matter than Rozetta silt loam, 6 to 10 percent slopes. From ½ to ⅔ of the original surface layer has been lost through erosion. In many small areas the brown subsoil has been exposed. The present surface layer is less than 8 inches thick.

This soil can be used about the same as Rozetta silt loam, 6 to 10 percent slopes. More careful management is required, however, to prevent further erosion. Also, larger amounts of a complete fertilizer and manure are needed to help restore the soil to its former high productivity. (Capability unit IIIe–1.)

Seaton Series

The Seaton series consists of deep, silty soils that are well drained. These soils are on upland ridges that border the Mississippi and Wisconsin Rivers. They have slopes ranging from 2 to 45 percent. These soils have formed under hardwoods in coarse-textured silt that has some fine sand in the lower part. The silt was blown onto the uplands from the flood plains of the Mississippi and Wisconsin Rivers during or just after the Wisconsin glacial period. The soils are limited in extent and generally are within 4 or 5 miles of the river bluffs.

These soils occur between areas of Lamont and Fayette soils. They are intermediate between those soils in texture and in profile development. The Seaton soils have a surface layer of grayish-brown silt loam. Their subsoil is friable, dark-brown silt loam. The substratum is yellowish-brown, coarse-textured silt loam or very fine sandy loam.

The natural fertility of these soils is moderately high, but the content of organic matter is low. The permeability and the moisture-supplying capacity are moderate. The soils are normally medium acid to strongly acid,

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if not limed. They erode easily; the hazard of erosion ranges from moderate to severe.

Seaton silt loam, 2 to 6 percent slopes (SeB).—Only a small part of this soil has been cultivated. The following describes a typical profile:

A 0 to 5 inches, dark grayish-brown silt loam; weak, fine, granular structure; friable; roots abundant; pH 6.5.
5 to 12 inches, grayish-brown silt loam; weak, thin, platy structure; friable; roots plentiful; pH 5.5.
B 12 to 36 inches, dark-brown silt loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 5.2.
C 36 inches +, yellowish-brown, gritty silt loam that grades to very fine sandy loam at depths below 48 inches; massive; friable; pH 6.3.

This soil is well suited to corn, small grains, and forage crops. Yields are fairly high if an adequate supply of plant nutrients is maintained. A cropping system is needed that will help build up the content of organic matter and protect the soil from water erosion. Close-growing crops should be grown 3 years out of 5. Mixtures of alfalfa and bromegrass grown on this soil produce high yields, but lime is required for legumes to yield well. The lime should be applied according to the needs indicated by soil tests. (Capability unit IIe–1.)

Seaton silt loam, 2 to 6 percent slopes, moderately eroded (SeB2).—Most of this soil has been cultivated. From ⅓ to ⅔ of the original surface layer has been lost through water erosion. The soil can be used about the same as Seaton silt loam, 2 to 6 percent slopes. More careful management is required, however, to prevent runoff from causing further damage. Larger amounts of fertilizer also are needed to restore this soil to its former productivity. (Capability unit IIe–1.)

Seaton silt loam, 6 to 10 percent slopes, moderately eroded (SeC2).—This soil has stronger slopes than Seaton silt loam, 2 to 6 percent slopes, and a more serious hazard of erosion. Row crops should be grown no oftener than 1 year out of 4 unless supporting practices are applied to prevent erosion. The soil is well suited to sod-forming crops. Mixtures of legumes and grasses grown on this soil produce moderate to high yields if the supply of plant nutrients is kept high. (Capability unit IIIe–1.)

Seaton silt loam, 6 to 10 percent slopes, severely eroded (SeC3).—This soil has stronger slopes and a thinner, lighter colored surface layer than Seaton silt loam, 2 to 6 percent slopes. More than two-thirds of the original surface layer has been lost. In some small areas plowing has exposed the dark-brown subsoil.

If this soil is used intensively, it will erode further and become even less suited to crops. Consequently, row crops should be grown no oftener than 1 year out of 4, even if practices are applied to conserve the soil. The soil needs to be kept in forage crops or in forest. Areas that are used for forage crops require renovating frequently. The areas in trees need protection from fire and from grazing by livestock. (Capability unit IVe–1.)

Seaton silt loam, 10 to 15 percent slopes (SeD).—This soil has stronger slopes than Seaton silt loam, 2 to 6 percent slopes, and a slightly thinner surface layer and thinner subsoil. Most of it has been kept in forest or in woodland pasture. If the soil is cultivated, there is a serious hazard of erosion.

This soil is better suited to pasture and hay crops or to trees or other permanent vegetation than to cultivated crops. If the areas are cleared, extra care is needed to protect the soil from water erosion.

To obtain high yields of forage, pastured areas require renovating. The areas under forest need protection from fire and from grazing and trampling by livestock. Selective cutting of trees will encourage the more desirable kinds of trees to grow. As a result, better returns will be obtained from the forests. (Capability unit IIIe–1.)

Seaton silt loam, 10 to 15 percent slopes, moderately eroded (SeD2).—This soil has a thinner, slightly browner surface layer than Seaton silt loam, 10 to 15 percent slopes, and is lower in organic matter. The present surface layer is less than 6 inches thick. The soil is better suited to permanent vegetation than to cultivated crops. Cultivated crops should be grown no oftener than 1 year out of 4. This soil is managed about the same as Seaton silt loam, 10 to 15 percent slopes. (Capability unit IIIe–1.)

Seaton silt loam, 10 to 15 percent slopes, severely eroded (SeD3).—This soil has lost more than two-thirds of its original surface layer through erosion. In many places part of the subsoil is gone. In most places numerous gullies have started to cut through. The content of organic matter is low.

This soil is better suited to renovated pasture and hay crops or to trees than to cultivated crops. If it is used for clean-tilled crops, further erosion will result. Areas that have been cultivated should be seeded as soon as feasible and kept in sod-forming crops. Areas planted to trees need protection from fire and from grazing by livestock. (Capability unit IVe–1.)

Seaton silt loam, 15 to 20 percent slopes (SeE).—This soil has a serious hazard of erosion, and little of it has been cultivated. It is similar to Seaton silt loam, 10 to 15 percent slopes, but it has stronger slopes. The two soils can be used and managed about the same, but farm machinery is more difficult to use on this soil.

This soil is better suited to forage crops or to trees than to cultivated crops. Nevertheless, if an adequate supply of plant nutrients is maintained and a suitable cropping system is used, row crops can be grown 1 year out of 4 without damage to the soil. (Capability unit IVe–1.)

Seaton silt loam, 15 to 20 percent slopes, moderately eroded (SeE2).—This soil is similar to Seaton silt loam, 10 to 15 percent slopes, but it has stronger slopes and a more serious hazard of erosion. The two soils can be used about the same. This soil, however, requires more careful management to prevent further damage as the result of water erosion. (Capability unit IVe–1.)

Seaton silt loam, 15 to 20 percent slopes, severely eroded (SeE3).—This soil has lost nearly all of its original surface layer through water erosion. In many places part of the subsoil is gone. Gullies are numerous. Many of them are too deep to be crossed by farm machinery. In many places the present plow layer is mostly brown subsoil. Further erosion is likely to cause so much damage that the soil will be difficult to reclaim.

This soil is better suited to forage crops and trees than to cultivated crops. The areas that are now used for

cultivated crops should be seeded to sod-forming crops or planted to trees as soon as feasible. (Capability unit VIe–1.)

Seaton silt loam, 20 to 45 percent slopes (SeF).—This soil is too steep to have farm machinery used on it. Therefore, most of it has been left in pasture or forest. If the areas are cleared, pastures on this soil make moderate yields during the early and late parts of the grazing season. In midsummer, the yields are generally low because of lack of moisture. Grazing should be controlled in the pastured areas. Forested areas need careful management if high yields are to be obtained. (Capability unit VIe–1.)

Seaton silt loam, 20 to 45 percent slopes, moderately eroded (SeF2).—Most of this soil has been overgrazed. As a result, it is eroded. The soil requires careful management and needs protection to prevent further erosion as the result of overgrazing. Forested areas and areas replanted to trees need protection from fire and from grazing by livestock. If the trees are cut selectively, the better kinds of trees will be encouraged. Better returns will be obtained from the wooded areas. (Capability unit VIe–1.)

Sogn Series

The Sogn series is made up of very shallow silt loams and loams that are somewhat excessively drained. The soils are on the uplands near the breaks to steep slopes. They have slopes that range from 2 to 20 percent. The soils have formed in a thin covering of loamy material over shattered limestone bedrock. In the cracks in the bedrock, there is reddish-brown residual clay in many places.

These soils are near the Dodgeville and Dubuque soils. Typically, they have a very dark gray to black surface layer and lack a subsoil. The bedrock of shattered limestone is generally at depths of less than 12 inches. In many places rocks occur on the surface and throughout the profile.

The natural fertility of these soils is moderately low. They have a low moisture-holding capacity and are droughty. The soils are neutral. They erode easily; the hazard of erosion is moderate to severe.

Sogn silt loam, 2 to 10 percent slopes, moderately eroded (SoB2).—This soil occurs in small areas scattered throughout the county. Most of it has been cultivated or has been overgrazed. As a result, more than one-third of the original surface layer has been lost through erosion. The following describes a typical profile:

A 0 to 10 inches, very dark brown silt loam; moderate, medium, granular structure; friable; many roots; occasional fragments of rock; pH 6.8.

10 to 13 inches, dark grayish-brown silt loam; moderate, medium, subangular blocky structure; friable; roots plentiful; occasional fragments of rock; pH 7.0.

D_r 13 inches +, shattered limestone bedrock that has reddish-brown, residual clayey material within the cracks.

This soil requires careful management to prevent further erosion. It is not suited to cultivated crops, but it can be tilled enough to use for rotation pasture or hay crops. If used for forage crops, the areas need renovating periodically to obtain moderate yields. The best forage plants to seed are mixtures of alfalfa and bromegrass. (Capability unit IVs–2.)

Sogn silt loam, 10 to 15 percent slopes (SoD).—Most of this soil has never been cultivated but has been pastured or has remained thinly wooded. Consequently, it has lost less of the original surface layer than Sogn silt loam, 2 to 10 percent slopes, moderately eroded.

The soil can be used for limited grazing or for limited production of trees. The areas that are in pasture should be protected from overgrazing. The wooded areas need protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Sogn silt loam, 10 to 15 percent slopes, moderately eroded (SoD2).—This soil has lost more than one-third of its original surface layer through water erosion. The soil is not suited to cultivation. If it is cultivated, it is likely to be damaged so severely that it will be difficult to restore. As soon as feasible, areas that are now cultivated should be seeded to grasses and legumes or planted to trees. Pastured areas need protection from overgrazing. Plantings of trees require protection from fire and from grazing by livestock. (Capability unit VIe–1.)

Sogn silt loam, 15 to 20 percent slopes (SoE).—This soil is similar to Sogn silt loam, 10 to 15 percent slopes, but it has stronger slopes. The two soils can be used and managed about the same. (Capability unit VIIs–1.)

Sogn silt loam, 15 to 20 percent slopes, moderately eroded (SoE2).—This soil has stronger slopes than Sogn silt loam, 10 to 15 percent slopes, but it is otherwise similar. It is better used for limited grazing or woodland than for cultivated crops. Grazing should be controlled. In areas where sod is hard to maintain, trees should be planted. (Capability unit VIIs–1.)

Sogn loam, 10 to 15 percent slopes (SnD).—This soil is similar to Sogn silt loam, 2 to 10 percent slopes, moderately eroded, but it has formed in coarser textured materials and has a loamy surface layer. In many places there are layers of sandstone within the limestone bedrock underlying this soil. In other places the soil is near bluffs where coarse-textured materials have been blown onto the limestone by wind.

This soil is better used for limited grazing or for woodland than for cultivated crops. Applying a complete fertilizer to the pastured areas will help to maintain the sod and increase yields. Grazing needs to be controlled. Wooded areas require protection from fire and from grazing by livestock. Selective cutting of the trees will improve the yields obtained from the woodlands. (Capability unit VIe–1.)

Sogn loam, 10 to 15 percent slopes, moderately eroded (SnD2).—Most of this soil has been cultivated or overgrazed. As a result, more than one-third of the original surface layer has been lost through erosion. The soil can be used and managed the same as Sogn loam, 10 to 15 percent slopes. (Capability unit VIe–1.)

Sogn loam, 15 to 20 percent slopes, moderately eroded (SnE2).—This soil is similar to Sogn loam, 10 to 15 percent slopes, but it has stronger slopes and a serious hazard of erosion. In some small areas the soil is only slightly eroded; in others, it is severely eroded. The soil is used about the same as Sogn loam, 10 to 15 percent

slopes, and management is about the same. (Capability unit VIIs–1.)

Sparta Series

The Sparta soils are deep and sandy and are excessively drained. They are on low stream terraces, mostly near Boscobel, Cassville, and Muscoda. Their slopes range from 0 to 15 percent, but in most places they are less than 2 percent. The soils have formed under prairie in sandy deposits that were laid down by water.

These soils occur near the Dakota soils, which are also on terraces but at slightly higher elevations. Their surface layer is typically a very dark gray loamy fine sand or fine sand that grades to yellowish-brown fine sand at depths between 18 and 24 inches.

The natural fertility of these soils is moderately low to low. Permeability is rapid to very rapid, and the moisture-holding capacity is low. The soils are slightly acid to strongly acid. They have a severe hazard of wind erosion.

Sparta loamy fine sand, 0 to 2 percent slopes (SsA).—This is the most extensive of the Sparta soils. It occurs in large areas along the Wisconsin and Mississippi Rivers. The following describes a typical profile located east of Boscobel:

A 0 to 16 inches, very dark gray loamy fine sand; weak, fine, granular structure; very friable when moist and loose when dry; roots abundant; pH 6.5.
16 to 24 inches, very dark grayish-brown loamy fine sand; weak, medium, subangular blocky structure; very friable; roots plentiful; pH 6.0.
C 24 inches +, yellowish-brown fine sand; single grain; loose; pH 5.8.

This soil has a severe hazard of erosion and should not be cropped intensively. Crops grown on it are often damaged by drought.

Melons, corn, oats, soybeans, and alfalfa are the crops generally grown, but yields are moderately low. Row crops should be grown no oftener than 1 year out of 4. Maintaining the content of organic matter, adding a complete fertilizer, and using supplemental irrigation will help to increase yields. The soil is near enough to rivers or other sources of water to make supplemental irrigation feasible. (Capability unit IVs–3.)

Sparta loamy fine sand, 0 to 2 percent slopes, eroded (SsA2).—This soil occurs in fairly small, scattered areas. It is similar to Sparta loamy fine sand, 0 to 2 percent slopes, but it has a thinner surface layer. From 6 to 10 inches of the original surface layer has been lost through erosion. Shallow blowouts and low dunes occur in many places.

This soil can be used about the same as Sparta loamy fine sand, 0 to 2 percent slopes. It requires more careful management, however, to prevent it from being damaged further through wind erosion. Planting shelterbelts and, if feasible, keeping a cover of plants on this soil will help to prevent more serious erosion. (Capability unit IVs–3.)

Sparta loamy fine sand, 2 to 6 percent slopes (SsB).—This soil has stronger slopes and occurs in more undulating areas than Sparta loamy fine sand, 0 to 2 percent slopes. In addition, the thickness of its surface layer is more variable. Generally, the surface layer is thicker in areas in the swales than in areas on the rises.

This soil can be used and managed about the same as Sparta loamy fine sand, 0 to 2 percent slopes. It is more likely to be eroded by water and wind, however, particularly where it receives runoff from higher areas. In many places, therefore, this soil requires practices to protect it from erosion by wind and water. (Capability unit IVs–3.)

Sparta loamy fine sand, 2 to 6 percent slopes, eroded (SsB2).—Originally, this soil had a surface layer that was 18 to 24 inches thick, but it has lost from 6 to 10 inches of its original surface layer through erosion. As a result, this soil is more droughty and is less productive than Sparta loamy fine sand, 2 to 6 percent slopes. It is also more likely to erode and requires more careful management. Adding large amounts of manure and growing more legumes in the rotation than clean-tilled crops will help to build up this soil. Turning crop residues under will also be helpful. (Capability unit IVs–3.)

Sparta loamy fine sand, 6 to 15 percent slopes (SsC).—Most of this soil has been kept in permanent pasture or forest, and only a few areas have been cultivated. This soil has stronger slopes and a thinner surface layer than Sparta loamy fine sand, 0 to 2 percent slopes. Its present surface layer is 16 to 20 inches thick. The soil has a severe hazard of wind erosion. The hazard of water erosion is moderate.

This soil is not well suited to cultivated crops. If erosion is controlled and an adequate supply of plant nutrients is maintained, however, a clean-tilled crop can be grown 1 year out of 4. (Capability unit VIIs–1.)

Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes (StA).—Shallow blowouts and low dunes make up this mapping unit. In the blowouts the soil is shallow. On the dunes it is deep because the wind has blown soil material onto those areas.

This soil can be used about the same as Sparta loamy fine sand, 0 to 2 percent slopes. Management is somewhat similar, but, if feasible, the soil needs to have a protective cover kept on it to prevent further erosion. Planting shelterbelts, applying mulches that are high in organic matter, and using a cropping system in which sod crops are grown more of the time than clean-tilled crops will help to prevent further damage by wind. (Capability unit IVs–3.)

Sparta fine sand and Dune land, 6 to 15 percent slopes (SrC).—The surface layer of this soil contains less fine material, less organic matter, and is slightly thinner than that of Sparta loamy fine sand, 0 to 2 percent slopes. Also, because it has stronger slopes, this soil has a greater hazard of erosion. Depth to the sandy substratum is generally about 18 inches. The following describes a typical profile:

A 0 to 12 inches, dark-gray fine sand; weak, fine, granular structure to single grain; very friable to loose; roots plentiful; pH 6.0.
12 to 18 inches, grayish-brown fine sand; single grain; loose; a few roots; pH 5.5.
C 18 inches +, yellowish-brown, medium-textured sand; single grain; loose; pH 6.1.

This soil is droughty and is likely to be blown about by winds. It is not suited to cultivated crops and needs to be kept in trees or used for limited grazing.

If this soil is pastured, grazing should be controlled and the soil otherwise carefully managed to prevent further damage by wind erosion. It is best to keep a protective cover of plants on the soil. Applying a complete fertilizer to pastures and controlling grazing will help to maintain a cover of sod. The soil needs to have livestock fenced out of wooded areas and the trees protected from fire. (Capability unit VIIs–1.)

Sparta fine sand and Blown-out land, 6 to 15 percent slopes (SpC).—This mapping unit consists mainly of areas where wind is still forming blowouts and dunes. In some places all of the original surface layer of Sparta fine sand has been removed by wind and part of the subsoil is gone. In other places Sparta fine sand has been buried under materials blown onto it by wind. This soil provides little forage for livestock. It is likely to be further damaged if it is grazed, and it is best to keep the areas in trees. In many places, however, dune formation is active and trees are hard to establish. (Capability unit VIIs–1.)

Stony Colluvial Land

Stony colluvial land (Su).—This miscellaneous land type consists of various kinds of large boulders and stones mixed with medium-textured soil materials. In many places it has been deposited over soils that are suited to farming. This land type occurs at the bases of steep slopes, at the heads of small draws, and on local fans on stream bottoms. It has slopes ranging from 2 to 10 percent.

Stony colluvial land needs to be kept in grass, trees, or other permanent vegetation. If feasible, runoff from higher lying areas should be controlled to prevent more of the stony colluvial material from being deposited. (Capability unit VIs–1.)

Stony Rock Land

This miscellaneous land type is made up of various kinds of shallow soils with many rock outcrops and many large boulders. The areas are on steep breaks below the upland ridges. They have slopes ranging from 20 to 60 percent.

The soil materials between the rock outcrops range from sand to silt in texture. They have formed in thin deposits of loess or in materials weathered from sandstone and limestone. Fertility is low. Runoff is rapid, and the hazard of erosion is severe.

Stony rock land, steep (Sv).—This miscellaneous land type has slopes ranging from 20 to 30 percent. It is not suited to cultivated crops and should be kept in woodland. Trees grow well on the areas, particularly on the north- and east-facing slopes where there are fine-textured soil materials. On the south- and west-facing slopes the land is more droughty and trees do not grow so well. Wooded areas need protection from fire and from grazing. Selective cutting will encourage the more desirable kinds of trees to grow. (Capability unit VIs–1.)

Stony rock land, very steep (Sw).—This miscellaneous land type has more rock outcrops and a larger proportion of coarse-textured soil materials than Stony rock land, steep. It is less desirable for growing trees. On the south- and west-facing slopes, there are many outcrops; the coarse-textured, shallow soils on these slopes support only a poor stand of timber. On the north- and east-facing slopes, trees grow well. The trees require protection from fire and from grazing by livestock. Selective cutting will encourage the more desirable kinds of trees to grow. (Capability unit VIIs–1.)

Stronghurst Series

The Stronghurst soils are deep and silty and are somewhat poorly drained. They are on upland ridges along natural drains and seepy areas. The soils have slopes ranging from 2 to 6 percent. They have formed under hardwoods in silty deposits more than 42 inches thick. The silt probably originated on the bottom lands of the Mississippi River but was blown onto the ridgetops by winds during or just after glacial times. It overlies bedrock of limestone or sandstone.

These soils occur near the Fayette and Rozetta soils. Typically, they have a surface layer of dark-gray silt loam. The subsoil is pale-brown silty clay loam mottled with yellowish brown, and the substratum is pale-brown silt loam.

The Stronghurst soils are moderately high in fertility but are low in organic matter. Permeability is moderately slow, and the moisture-supplying capacity is high. These soils are normally medium acid to strongly acid, but liming has raised the pH to approximately neutral in most places in the county.

Stronghurst silt loam, 2 to 6 percent slopes (SyB).—This soil is not extensive. It occurs in small areas throughout the county. The following describes a typical profile:

A 0 to 5 inches, dark-gray silt loam; moderate, fine, granular structure; friable; roots abundant; pH 6.5.
5 to 15 inches, light brownish-gray silt loam; moderate, medium, platy structure; friable; roots plentiful; slightly vesicular, and contains a few small iron concretions; pH 6.0.
B 15 to 37 inches, pale-brown silty clay loam; many, large, distinct mottles of yellowish brown and strong brown; moderate, medium, angular blocky structure; hard when dry, but slightly plastic when wet; roots plentiful to a depth of 24 inches, but few below that depth; pH 5.5.
C 37 inches +, pale-brown silt loam; massive; friable; this horizon is more highly mottled than the horizon immediately above; pH 5.6.

This soil stays wet and cold in spring longer than the surrounding soils and cannot be tilled so soon as those soils. It has a moderate hazard of erosion. Nevertheless, it can be managed fairly easily and is easy to work. This soil can be used fairly intensively if good tilth and an adequate supply of plant nutrients and organic matter are maintained. If feasible, terracing, contour stripcropping, and other practices should be applied to prevent erosion.

This soil is well suited to corn, small grains, grasses, and clover, but it requires drainage before alfalfa can be grown successfully. Tile drains or diversion ditches can be used to provide drainage. Crops on this soil respond well if lime and a complete fertilizer are applied and if organic matter is added. If the soil is well managed otherwise, yields are moderate to high. Corn makes

even better yields if supplemental nitrogen fertilizer is applied. Alfalfa requires lime, phosphate, and potash. (Capability unit IIw–1.)

Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded (SyB2).—This soil is similar to Stronghurst silt loam, 2 to 6 percent slopes, but its surface layer is thinner and lighter colored and is lower in organic matter. From 5 to 8 inches of the original surface soil has been lost through erosion. The remaining surface soil has poorer tilth than the original one and is harder to keep from eroding.

This soil can be used about the same as Stronghurst silt loam, 2 to 6 percent slopes. It requires more intensive management, however, to prevent further erosion and the corresponding lowering of yields. Also, larger amounts of fertilizer and manure are required to build up the supply of plant nutrients and organic matter. Using care in tilling the soil will help to maintain good tilth. (Capability unit IIw–1.)

Tama Series

The Tama soils are deep and silty and are well drained. They are on upland ridges and have slopes ranging from 0 to 15 percent. These soils have formed under prairie in a thick blanket of silt. The silt probably originated on the flood plains of the Mississippi River and was blown onto the uplands by winds during or just after the last glaciation. It overlies bedrock of limestone or sandstone.

The surface layer of these soils is typically black silt loam. The subsoil is dark-brown silty clay loam, and the substratum is yellowish-brown silt loam. A profile of a Tama silt loam is shown in figure 10.

The natural fertility of these soils is high. Permeability is moderate, and the moisture-supplying capacity is high. Normally, the soils are leached and are slightly acid to strongly acid, unless limed. They are among the most desirable soils for agriculture in the county.

Tama silt loam, 0 to 2 percent slopes (TaA).—This soil occurs at the highest elevations on the broader ridgetops. The following describes a typical profile in a field that has been limed:

A 0 to 8 inches, black silt loam; moderate, fine, crumb structure; friable; roots abundant; pH 7.0.
8 to 16 inches, very dark gray silt loam; moderate, coarse, granular structure; friable when moist; roots plentiful; pH 6.1.
B 16 to 20 inches, dark grayish-brown silt loam; moderate, medium, subangular blocky structure; friable; roots plentiful; pH 5.3.
20 to 36 inches, dark-brown silty clay loam; moderate, medium, subangular blocky structure; firm; roots plentiful; pH 5.5.
C 36 inches +, brown silt loam that grades to yellowish brown with increasing depth; massive; friable; a few roots; pH 6.1.

This soil is easy to manage and can be tilled easily. It has a slight hazard of erosion, but it is well suited to all the crops commonly grown in the county. The crops respond well if lime and a complete fertilizer are added.

Clean-tilled crops can be grown intensively on this soil. If an adequate supply of plant nutrients is maintained and organic matter added, yields are high. Easily applied practices are required to protect the soil from water erosion. Lime is generally needed for high yields of legumes. (Capability unit I–1.)

Figure 10.—**Typical profile of a Tama silt loam. (Photo by F. D. Hole, Soil Survey Division, University of Wisconsin.)**

Tama silt loam, 2 to 6 percent slopes (TaB).—This soil has stronger slopes and a slightly greater hazard of erosion than Tama silt loam, 0 to 2 percent slopes. It should be cultivated less intensively. Also, it needs more careful management to protect it from erosion caused by runoff. (Capability unit IIe–1.)

Tama silt loam, 2 to 6 percent slopes, moderately eroded (TaB2).—This is the most extensive of the Tama soils in the county. It has lost from ⅓ to ⅔ of the original surface soil through water erosion. As a result, it is lower in organic matter, generally is less fertile, and is more likely to erode than Tama silt loam, 0 to 2 percent slopes.

This soil can be used the same as Tama silt loam, 0 to 2 percent slopes. It requires more careful management, however, to prevent further erosion. Contour stripcropping, terracing, and similar practices will help to protect the soil. Adding large amounts of a complete fertilizer and manure will help to restore the soil to its former productivity. (Capability unit IIe–1.)

Tama silt loam, 2 to 6 percent slopes, severely eroded (TaB3).—This soil has lost more than two-thirds of the original surface layer through water erosion. The present surface layer is very dark gray. In places there are dark grayish-brown patches where plowing has mixed part of the subsoil with the remaining surface soil.

This soil is low in organic matter and fertility. Nevertheless, if practices are used to protect it from further

erosion, it can be cultivated as intensively as Tama silt loam, 2 to 6 percent slopes, moderately eroded. A cropping system is required in which close-growing crops are grown more of the time than clean-tilled crops. Large amounts of manure and crop residues are needed to help build up the content of organic matter. Lime and a complete fertilizer should be added to help build up the supply of plant nutrients. (Capability unit IIIe–1.)

Tama silt loam, 6 to 10 percent slopes, moderately eroded (TaC2).—This soil is similar to Tama silt loam, 0 to 2 percent slopes, but its surface layer is thinner and has a slightly lighter color. The hazard of erosion is moderate to severe. More than one-third of the original surface layer has been lost through water erosion.

Because of its strong slopes and hazard of erosion, this soil is limited in its use for crops. A cropping system is required in which close-growing crops are grown more of the time than clean-tilled crops. Practices are also required to control erosion. Applying a complete fertilizer and adding organic matter will help to make the soil more productive. For legumes to make good yields, the lime should be applied according to the needs indicated by soil tests. (Capability unit IIIe–1.)

Tama silt loam, 6 to 10 percent slopes, severely eroded (TaC3).—This soil has less than 6 inches of its original surface layer remaining. In many places plowing has exposed the dark grayish-brown subsoil. The soil is likely to be damaged further through erosion. Consequently, unless practices are applied to prevent erosion, this soil should be used for clean-tilled crops no oftener than 1 year out of 4. Building up the supply of plant nutrients and adding organic matter will help to obtain high yields. (Capability unit IVe–1.)

Tama silt loam, 10 to 15 percent slopes (TaD).—Most of this soil occurs in fairly small areas. Much of it has been kept in pasture. It has a slightly thinner, lighter colored surface layer and stronger slopes than Tama silt loam, 0 to 2 percent slopes. If it is cultivated, the hazard of erosion is severe.

Unless practices are applied to prevent erosion, row crops should be grown on this soil no oftener than 1 year out of 4. If the soil is pastured, the areas require renovation periodically to help increase yields. The soil needs to have an adequate supply of plant nutrients maintained. It also needs protection from erosion and needs other good management. (Capability unit IIIe–1.)

Tama silt loam, 10 to 15 percent slopes, moderately eroded (TaD2).—This soil has lost from ⅓ to ⅔ of its original surface layer through water erosion. As a result, it is lower in fertility and organic matter than Tama silt loam, 10 to 15 percent slopes. The two soils can be used in the same way, but this soil requires more careful management to prevent further erosion. Larger amounts of a complete fertilizer and manure are also required to maintain present yields. (Capability unit IIIe–1.)

Tama silt loam, 10 to 15 percent slopes, severely eroded (TaD3).—This soil occurs in areas where it receives large amounts of runoff from higher lying soils. It is similar to Tama silt loam, 10 to 15 percent slopes, but it has little or no surface soil remaining. This soil should not be used for row crops unless practices are applied to conserve the soil. It is probably best suited to hay crops or pasture, but the areas will need to be renovated. (Capability unit IVe–1.)

Terrace Escarpments

This miscellaneous land type occurs mainly along the Mississippi and Wisconsin Rivers, although some areas are along other major streams in the county. It is made up of soils that are in many small, narrow, ribbonlike areas. The areas are between terraces of two different levels where slopes range from 16 to 45 percent. The texture of the surface layer in the soils ranges from fine sand to silt loam. There is a severe hazard of erosion.

Terrace escarpments, medium textured (Tc).—This miscellaneous land type is made up of Bertrand and Medary silt loams and Meridian loam. The surface layer in these soils is medium textured, and the subsoil is finer textured. The fertility and moisture-supplying capacity are moderate.

This miscellaneous land type is not suited to cultivated crops. It should be kept in pasture or in woodland. If overgrazing is prevented and erosion is controlled, yields of forage crops are moderate. Renovation practices can be used to improve the pastures if the slopes are not too steep to prevent the use of farm machinery. The wooded areas require protection from fire and from grazing by livestock. On the north- and east-facing slopes, high yields are obtained from the woodlands. On the south- and west-facing slopes, yields are lower. (Capability unit VIe–1.)

Terrace escarpments, coarse textured (Te).—This miscellaneous land type is made up of Chelsea fine sand, Meridian fine sandy loam, and Sparta loamy fine sand. The soils have a coarser textured surface layer and subsoil than the soils that make up Terrace escarpments, medium textured, and they are less productive. They have a low moisture-holding capacity.

This land type is not suited to cultivated crops. It should be kept in pasture, in woodland, or in other permanent vegetation. It generally is not feasible to renovate pastured areas. The areas that are pastured require careful management to prevent overgrazing and resultant erosion. The wooded areas require protection from fire and from grazing by livestock. Yields are poor to moderate, depending on the moisture-supplying capacity and on the direction of the slopes. (Capability unit VIIs–1.)

Toddville Series

The Toddville soils are deep and silty and are moderately well drained. They occur on stream terraces and have formed under prairie in deposits of water-laid silt. The silt is 42 or more inches thick and overlies stratified sand.

These soils are near the Richwood soils. Typically, they have a surface layer of black silt loam. The subsoil is dark-brown silty clay loam and is mottled in the lower part. The substratum is dark brown and silty.

The Toddville soils are high in natural fertility and in organic matter. Permeability is moderate, and the

moisture-supplying capacity is high. The soils are slightly acid to strongly acid, unless limed. Only one soil, Toddville silt loam, is mapped in this county.

Toddville silt loam (To).—This soil has slopes of less than 2 percent. It occurs in fairly large areas but is not extensive in this county. The following describes a typical profile in a field that has been limed:

A 0 to 12 inches, black silt loam; moderate, medium, granular structure; friable; roots abundant; pH 7.0.
12 to 16 inches, very dark grayish-brown silt loam; weak, coarse, subangular blocky structure; friable; roots plentiful; pH 5.8.
B 16 to 26 inches, dark-brown silt loam; weak, medium, subangular blocky structure; friable; roots plentiful; pH 5.5.
26 to 44 inches, dark-brown silty clay loam; a few, fine, faint, yellowish-red mottles in upper part, but mottles are more distinct, numerous, and larger in the lower part; moderate, medium, subangular blocky structure; firm; roots plentiful; pH 5.5.
C 44 inches +, dark grayish-brown to dark-brown silt loam; many, medium, distinct mottles of yellowish red; massive; friable; many old channels of sedge roots, stained with organic matter; pH 5.5.

Good tilth is easy to maintain in this soil. There is a slight hazard of erosion, particularly in areas that receive runoff from higher lying areas.

The soil can be farmed intensively and is suited to all of the crops commonly grown in the county. Yields are high if an adequate supply of plant nutrients and organic matter are maintained. Lime is needed in many places for high yields of legumes. Using diversion terraces to control runoff from the slopes above will help to increase yields. (Capability unit I–1.)

Use and Management of the Soils

This section consists of four main parts. In the first part the soils are grouped in capability units. Each unit is described and the crops and main farming methods suited to the soils in the units are given. These capability units fit into a nationwide system of capability classes and subclasses based on potentialities and limitations of the soils for the most common farm crops and pasture plants. Other groupings of soils are likely to be needed for other purposes.

The second part of the section gives estimates of yields of the principal crops in each mapping unit. The third part contains a discussion of management of the soils for woodland, and the fourth tells some of the properties that are of importance in using the soils for engineering purposes.

Capability Grouping of Soils

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, and wildlife. It is a practical grouping based on the needs and limitations of the soils, on the risk of damage to them, and also on their response to management. There are three levels above the soil mapping unit in this grouping. They are the capability unit, subclass, and class.

The capability unit is the lowest level in which soils are grouped in the capability grouping. Capability units, or management groups as they are sometimes called, consist of soils that are similar in kind of management needed, in risk of damage, and in general suitability for use. Capability units are subdivisions of capability subclasses and are identified by arabic numerals, for example, 1, 2, and 6 in the classification symbols IIe–1, IIe–2, and IIe–6. Since management groups are numbered in a broad system, not all groups occur in this county and the numbers do not run consecutively.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is risk of erosion if the plant cover is not maintained; "w" means excess water that retards plant growth or interferes with cultivation; and "s" shows that the soils are shallow, droughty, or unusually low in fertility. In some parts of the country, there is a subclass "c" for the soils that are limited chiefly by a climate that is too cold or too dry.

The broadest grouping, the land capability class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All the land classes, except class I, may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly but do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping; consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty, slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly but have a narrower range of use than those in classes I and II. These need even more careful management.

In class IV are soils that have greater natural limitations than those in class III, but they can be cultivated for some crops under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops but that can be used for pasture or range, as woodland, or for wildlife.

Class V soils are nearly level or gently sloping and are not likely to erode but are droughty, wet, low in supply of plant nutrients, or otherwise unsuitable for cultivation.

Class VI soils are not suitable for many of the ordinary crops, because they are steep, droughty, or otherwise limited, but they give fair yields of forage crops, orchard crops, or forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out, or special perennial crops or pastures can be seeded.

Class VII soils have very severe limitations that make them unsuited to crops and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII consists of soils that have practically no agricultural use. The soils have value as parts of water-

sheds, and some have value as wildlife habitats or for scenery.

Capability classes, subclasses, and units

The capability classes, subclasses, and units in which the soils of Grant County are classified are defined in the listing that follows.

Class I.—Deep, well drained to moderately well drained, nearly level, productive soils. Suitable for intensive long-time use under cultivation if good farming practices are followed:
- Unit I–1: Deep, nearly level, silty soils.

Class II.—Soils that can be cultivated with moderate risk of erosion or that have other moderate limitations.
- Subclass IIe.—Gently sloping soils that have moderate risk of erosion and that require protection if cultivated.
  - Unit IIe–1: Deep, gently sloping, silty soils.
  - Unit IIe–2: Moderately deep soils that are underlain by sand or clay residuum over bedrock.
  - Unit IIe–6: Silty soils with clayey subsoils.
- Subclass IIw.—Soils with slightly impeded drainage that makes them seasonally wet and that restricts their use for some sensitive crops.
  - Unit IIw–1: Deep, somewhat poorly drained or poorly drained soils.
  - Unit IIw–11: Deep, silty soils on flood plains or on alluvial-colluvial slopes.
- Subclass IIs.—Soils that are slightly droughty and that require some practices to conserve moisture and control wind erosion.
  - Unit IIs–1: Loamy soils that are underlain by loose sand.

Class III.—Soils that have severe limitations that restrict the choice of plants, or that require special conservation practices, or both.
- Subclass IIIe.—Gently sloping to strongly sloping soils that erode if not protected.
  - Unit IIIe–1: Deep, silty soils.
  - Unit IIIe–2: Moderately deep soils that are underlain by sandstone or limestone.
- Subclass IIIw.—Soils that are severely limited in use by excess water.
  - Unit IIIw–14: Somewhat poorly drained soil on flood plains subject to frequent flooding.
- Subclass IIIs.—Soils that are severely limited by their low capacity for storing water that plants can use.
  - Unit IIIs–2: Moderately deep soils that are underlain by loose sand or bedrock.

Class IV.—Soils with very severe limitations that restrict the choice of plants but that can be cultivated with special management.
- Subclass IVe.—Sloping to moderately steep soils that are easily eroded.
  - Unit IVe–1: Deep, silty soils.
  - Unit IVe–2: Silty or loamy soils that are underlain by sandstone or limestone.
  - Unit IVe–7: Somewhat excessively drained, sandy soils.
- Subclass IVs.—Droughty, sandy soils.
  - Unit IVs–3: Deep, sandy soils subject to rapid leaching.

Class V.—Nearly level or gently sloping soils that are not suitable for cultivation but that have no outstanding limitations if used for pasture, as woodland, or for wildlife.
- Subclass Vw.—Nearly level, poorly drained soils that are too wet for cultivation.
  - Unit Vw–1: Mixed gravelly, sandy, or silty soil that has a high water table and that is subject to frequent overflow.

Class VI.—Soils with severe limitations that make them generally unsuited to cultivation and that limit their use chiefly to pasture, woodland, or wildlife areas.
- Subclass VIe.—Soils that have a severe hazard of erosion or that are severely eroded.
  - Unit VIe–1: Strongly sloping to steep soils that erode easily or that are eroded.
- Subclass VIs.—Soils that are droughty, or shallow, or low in fertility.
  - Unit VIs–1: Sloping to very steep, sandy, stony, or rocky soils.

Class VII.—Soils that are unsuitable for cultivation and that have very severe limitations that restrict their use largely to pasture, or woodland, or to wildlife habitats.
- Subclass VIIe.—Soils subject to severe erosion or that are eroded.
  - Unit VIIe–1: Moderately deep to deep soils on steep slopes.
- Subclass VIIs.—Soils that hold little moisture available that plants can use.
  - Unit VIIs–1: Sandy, stony, or shallow soils.

Class VIII.—Soils suitable for wildlife or for recreation but that are not suitable for growing farm or woodland crops.
- Subclass VIIIw.—Soils that are flooded most of each year.
  - Unit VIIIw–1: Wet soil that grows cattails, bulrushes, and other plants suited to shallow water.

Management by Capability Units

Soils in one capability unit have about the same limitations and similar risks of damage. The soils in one unit, therefore, need about the same kind of management, though they may have been formed from different kinds of parent material and in different ways. The capability units are described in the following pages. The soils in each unit are listed, and management suitable for all the soils of the unit is suggested.

To avoid repeating for each unit practices that fit all soils that are suitable for crops, pasture, trees, or wildlife, the following practices are summarized and are to be considered along with the practices suggested in each capability unit:

TILLED CROPS

1. Apply lime and fertilizer in the amounts indicated by soil tests and field trials.
2. Return crop residues to the soil, and add barnyard manure and green manure to supply fresh organic matter and to improve soil tilth.
3. To dispose of excess water, build new waterways or reshape old ones where necessary; reseed and maintain to keep them working well.

4. Seed headlands (areas to turn machinery at the edges of fields), and keep them in grass. Mow accessible headlands and waterways after the time to harvest small grain—otherwise, ground-nesting birds will be injured or their nests will be destroyed.

PASTURE RENOVATION

1. Test the soil to determine need for lime and fertilizer.
2. Apply lime 6 months before seeding.
3. Remove, where feasible, stones, stumps, and other obstructions that interfere with use of farm equipment.
4. Prepare a good seedbed:
   (1) Plow the level to gently sloping soils on the contour.
   (2) Work the steeper slopes so as to leave a mulch on the surface, but do not plow. Start preparing the seedbed several weeks or months before the date of seeding by eradicating weeds through cultivation, spraying, or both.
5. Reseed:
   (1) Use legumes and grasses best suited to the soils that will be productive at the season when pasture is needed.
   (2) Inoculate the legumes.
   (3) Seed the pasture mixture with a companion crop that will control erosion; use no more than 1 bushel of oats per acre.
   (4) Cover seed lightly; use a cultipacker seeder or similar implement that will put seed at the proper depth. If seed is broadcast, a cultipacker will help cover the seed and firm the seedbed.
   (5) Apply phosphate and potash at the time of seeding. If fertilizer is broadcast, work it into the soil before seeding. Band seeding—drilling the fertilizer in a band 1 inch below the grass and legume seed—will help in getting the stand of pasture plants established.
   (6) Pasture the companion crop when it is about 8 inches high to keep it from competing too strongly with young forage plants.

Pasture improvement and maintenance:

1. Control grazing:
   (1) Avoid overgrazing throughout the season.
   (2) Delay grazing in spring until the ground is firm and growth is well started.
   (3) Do not graze pastures for 1 month before the first hard frost in fall (normally, September 30). Provide this protection every year if the pasture contains alfalfa, and at least every other year if the pasture is grass.
   (4) Divide the pasture into three or more parts, and rotate the grazing. This gives the plants a chance to recover and prolongs the life of legumes and grasses.
2. Control weeds and brush:
   (1) Mow weeds before they set seed. Except where daily-ration grazing is practiced, do the mowing before the livestock are removed from the pasture. Cattle will eat wilted weeds and vegetation from urine spots after this vegetation has been mowed.
   (2) Spray to control weeds and brush where spraying is more economical and effective than mowing.
3. Topdress with lime and fertilizer:
   (1) Lime acid soils to encourage whiteclover or similar legumes that will furnish nitrogen for the grasses in the pasture mixture.
   (2) Test the soils, and apply phosphate and potash to increase yields.
   (3) Apply nitrogen to grass in spring if earlier grazing is desired. If enough moisture is available, nitrogen will increase the total yield of grass and improve its protein content. Repeated application of nitrogen, however, will encourage grasses to force legumes out of the pasture mixture.

WILDLIFE AREAS

1. Do not burn fence rows, roadsides, odd areas, or sloughs.
2. On upland soils plant low-growing shrubs along permanent fences and maintain existing shrubs. Remove trees because they take too much water from crops in adjoining fields. Do not spray or burn the trees.
3. Improve for wildlife the eroded spots in fields, bare knobs, small blowouts, large gullies, abandoned roads and railroad rights-of-way, borrow pits, gravel pits, and even bits of good land cut off from fields. For best results, the areas need to be at least one-fourth acre in size. Exclude livestock.
4. On upland soils plant and maintain evergreens and shrubs in a rod-wide border between woods and crop fields.
5. Do not drain ponds and potholes suitable for wildlife.
6. Improve marshy areas by level ditching or water-level controls.

Capability unit I–1

The soils in this capability unit are deep and nearly level. Except for the Muscatine soil, which is somewhat poorly drained, they are well drained to moderately well drained. They are moderately permeable and have moderately high to high moisture-holding capacity. The soils are easy to manage and conserve, and good tilth is easy to maintain. The following soils are in this unit:

Bertrand silt loam, 0 to 2 percent slopes.
Jackson silt loam, 0 to 2 percent slopes.
Muscatine silt loam, 0 to 2 percent slopes.
Richwood silt loam, 0 to 2 percent slopes.
Tama silt loam, 0 to 2 percent slopes.
Toddville silt loam.

The soils of this unit are well suited to corn, small grains, and forage crops and to special crops, such as peas, potatoes, and tobacco. They are also suited to trees and to use for providing food and cover for wildlife.

Suitable cropping systems for these soils are:

2 years of row crops followed by 1 year each of a small grain and hay.
2 years of row crops followed by 1 year of small grain and then by 2 years of hay.
1 year each of a row crop and small grain followed by 2 years of hay.

Continuous row crops with a cover crop of rye, or continuous row crops with stover left on the field.

Capability unit IIe–1

The soils in this capability unit are deep and gently sloping. Except for the Muscatine soils, which are somewhat poorly drained, they are well drained to moderately well drained. They have moderate to high moisture-holding capacity, and good tilth is fairly easy to maintain. The following soils are in this unit:

Bertrand silt loam, 2 to 6 percent slopes.
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded.
Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded.
Downs silt loam, 2 to 6 percent slopes, moderately eroded.
Dubuque silt loam, deep, 2 to 6 percent slopes.
Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded.
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.
Jackson silt loam, 2 to 6 percent slopes.
Jackson silt loam, 2 to 6 percent slopes, moderately eroded.
Muscatine silt loam, 2 to 6 percent slopes.
Muscatine silt loam, 2 to 6 percent slopes, moderately eroded.
Richwood silt loam, 2 to 6 percent slopes.
Seaton silt loam, 2 to 6 percent slopes.
Seaton silt loam, 2 to 6 percent slopes, moderately eroded.
Tama silt loam, 2 to 6 percent slopes.
Tama silt loam, 2 to 6 percent slopes, moderately eroded.

These soils are well suited to corn, small grains, grasses, and legumes and to special crops, such as peas, potatoes, and tobacco. They are also suited to trees and to wildlife.

If these soils are cultivated, practices are required to control erosion. Turning under crop residues and green manure and adding barnyard manure will help to supply fresh organic matter, add plant nutrients, and improve tilth.

Suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and small grain followed by 2 years of hay.
Terracing: 3 years of row crops followed by 1 year of small grain and then by 2 years of hay; or 4 years of row crops followed by 1 year of small grain with sweetclover plowed under in spring.
Terracing plus wheel-track planting: 5 years of row crops followed by 1 year of small grain and then by 2 years of hay.

If special conservation practices are not used, a suitable cropping system is:

1 year each of a row crop and small grain and then 2 years of hay.

Capability unit IIe–2

The soils in this capability unit are moderately deep, silty or loamy soils that are underlain by sand or by clay residuum over bedrock. They are well drained. In most places these soils are 2 to 3 feet deep, and at these depths they have a moderate moisture-holding capacity. They are moderate in fertility. The soils are slightly droughty and are likely to erode if not protected. The following soils are in this unit:

Dubuque silt loam, 2 to 6 percent slopes.
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.
Gale silt loam, 2 to 10 percent slopes.
Gale silt loam, 2 to 10 percent slopes, moderately eroded.
Hesch loam, 2 to 10 percent slopes, moderately eroded.
Hixton loam, 2 to 10 percent slopes.
Hixton loam, 2 to 10 percent slopes, moderately eroded.

The soils of this unit are well suited to corn, small grains, grasses, and legumes. They are also suited to trees and to wildlife.

If these soils are used for tilled crops, practices are required to control erosion. The soils are easy to work if the content of organic matter is kept high. Yields are moderately high if the soils are well managed.

Suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and small grain followed by 2 or 3 years of hay.
Terracing: 2 years of row crops followed by 1 year of small grain and then by 2 years of hay.

If contour stripcropping and terracing are not used, a suitable cropping system is:

1 year each of a row crop and small grain and then 3 years of hay. This cropping system is not suitable, however, where the slopes are more than 200 feet long.

Capability unit IIe–6

The soils in this capability unit are deep and are moderately well drained. They have surface layers of silt loam, subsoils of silty clay, and substrata of stratified silt and clay. The soils are moderate in fertility and have high moisture-holding capacity. In some places water collects as a result of runoff from slopes above. If tilled crops are to be grown, surface drainage is needed to get high yields. The soils are only slightly erodible. The following soils are in this unit:

Medary silt loam, 0 to 2 percent slopes.
Medary silt loam, 2 to 6 percent slopes, moderately eroded.

These soils are suited to corn, small grains, grasses, alfalfa, ladino clover, alsike clover, and other legumes. They are also fairly well suited to trees and are well suited as wildlife areas.

Surface ditches can be used to help dispose of excess water. Where water from higher areas is a problem, diversion ditches are desirable.

A suitable cropping system is 1 year each of a row crop and small grain followed by 2 years of hay.

Capability unit IIw–1

The soils in this capability unit are deep and silty and are somewhat poorly drained to poorly drained. Most of the soils are nearly level, but some are gently sloping. These soils occur in depressions, along drainageways, or on the side slopes of uplands and stream terraces. They are underlain by clayey materials that break to irregular blocks when dry; water moves readily downward through the cracks between the blocks. The soils are moderate to high in fertility. They have high moisture-holding capacity, and, during wet periods, they are likely to be saturated. The following soils are in this unit:

Atterberry silt loam, 0 to 2 percent slopes.
Atterberry silt loam, 2 to 6 percent slopes.
Curran silt loam.
Garwin silty clay loam.
Stronghurst silt loam, 2 to 6 percent slopes.
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.

If adequately drained, these soils are well suited to corn and small grains and to the grasses and legumes that grow well in the area. Alfalfa can be grown if sufficient drainage is provided, but alsike and ladino clover can be grown instead of alfalfa. If adequate amounts of fertilizer are applied and a suitable cropping system is used, yields are moderate to high.

Drainage can be provided by tile lines if suitable outlets are available. Diversion terraces can be used to protect the soils from runoff from adjoining higher areas. Surface ditches can be used in other places. In some places tile drains, diversion terraces, and surface ditches can be used in combination to provide drainage.

If tile drains are used, good structure must be maintained in the surface layer so that excess moisture can enter the soil and move downward to the tile. Growing grasses and legumes, adding barnyard manure or green manure, and working the soil only when it is dry enough to prevent puddling will help improve the structure.

Suitable cropping systems are:

3 years of row crops followed by 1 year of small grain and then by 2 years of hay.
2 years of row crops followed by 1 year each of small grain and hay.
1 year each of a row crop, small grain, and hay.

On the gently sloping areas, use contour stripcropping or terracing; or, if necessary, use both practices.

Capability unit IIw–11

This unit consists of deep, silty soils that are well drained to moderately well drained. The soils have slopes of 0 to 10 percent. Some areas are on flood plains or in fan-shaped areas at the mouths of streams. Others are on the bottoms of narrow valleys. The soils are high to moderately high in fertility. In most of the areas, crops are damaged infrequently by flooding. A few areas, however, are flooded more frequently. The following soils are in this unit:

Arenzville silt loam.
Chaseburg silt loam, 0 to 3 percent slopes.
Chaseburg silt loam, 3 to 6 percent slopes.
Judson silt loam, 0 to 3 percent slopes.
Judson silt loam, 3 to 10 percent slopes.

For best production, these soils need dikes to protect them from flooding by streams. In many places they also need diversion terraces to protect them from runoff from higher lying areas. Sloping, shaping, and seeding the natural waterways will help reduce flooding.

If adequately protected from excess water, these soils are well suited to corn, tobacco, small grains, grasses, and legumes. Areas that are inaccessible or that are flooded frequently are best used for permanent pasture, for woodland, or as wildlife areas.

A suitable cropping system in protected areas consists of growing a row crop 1 year out of 3. On the nearly level soils, row crops can be grown continuously if the supply of plant nutrients is kept high and the content of organic matter and good tilth are maintained. If row crops are grown continuously, plow under plant residues or green-manure crops and add large amounts of barnyard manure.

Capability unit IIs–1

This unit consists of well-drained, moderately deep, loamy soils on stream terraces, or high benches. The soils are underlain by loose sand. They are moderately fertile and have moderate moisture-holding capacity. The soils are slightly droughty. In areas where the content of organic matter is high, they have good tilth. The following soils are in this unit:

Meridian loam, 0 to 2 percent slopes.
Meridian loam, 2 to 6 percent slopes.
Meridian loam, 2 to 6 percent slopes, moderately eroded.

The soils of this unit are suited to corn, small grains, grasses, and legumes. They are also suitable for trees and as wildlife areas. The loamy surface soil makes a good seedbed if the content of organic matter is kept high. The organic matter will improve the structure, thus permitting moisture to enter the surface soil readily. Because the soils are underlain by loose sand, it is particularly important to conserve moisture.

These soils need a cropping system that will return organic matter, improve tilth, and give protection from erosion by wind and water. If tilled crops are grown, the soils that have slopes of 2 to 6 percent need practices to control erosion.

Suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and a small grain and 2 years of hay.
Terracing: 2 years of row crops, 1 year of small grain, and 2 years of hay.
Terracing plus wheel-track planting: 3 years of row crops, 1 year of small grain (sweetclover plowed under in spring), or 4 years of row crops followed by 1 year each of a small grain and hay.

If special conservation practices are not used, a suitable cropping system for soils that have slopes of 2 to 6 percent is:

1 year each of a row crop and small grain followed by 3 years of hay.

If special conservation practices are not used, a suitable cropping system for soils that have slopes of less than 2 percent is:

1 year each of a row crop and small grain followed by 2 years of hay.

Capability unit IIIe–1

This unit consists of deep, moderately well drained to well drained, silty soils with slopes ranging from 2 to 15 percent. The soils have high moisture-holding capacity. They are moderately low to high in fertility. The following soils are in this unit:

Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded.
Bertrand silt loam, 6 to 10 percent slopes.
Bertrand silt loam, 6 to 10 percent slopes, moderately eroded.
Bertrand silt loam, 10 to 15 percent slopes, moderately eroded.
Chaseburg silt loam, 6 to 15 percent slopes.
Dodgeville silt loam, deep, 6 to 10 percent slopes.
Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded.
Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded.
Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded.

Downs silt loam, 2 to 6 percent slopes, severely eroded.
Downs silt loam, 6 to 10 percent slopes.
Downs silt loam, 6 to 10 percent slopes, moderately eroded.
Downs silt loam, 10 to 15 percent slopes, moderately eroded.
Dubuque silt loam, deep, 6 to 10 percent slopes.
Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded.
Dubuque silt loam, deep, 10 to 15 percent slopes.
Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded.
Dubuque soils, deep, 2 to 6 percent slopes, severely eroded.
Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded.
Fayette silt loam, uplands, 6 to 10 percent slopes.
Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded.
Fayette silt loam, uplands, 10 to 15 percent slopes.
Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded.
Fayette silt loam, valleys, 6 to 10 percent slopes.
Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded.
Fayette silt loam, valleys, 10 to 15 percent slopes.
Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded.
Jackson silt loam, 6 to 10 percent slopes, moderately eroded.
Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded.
Medary silt loam, 6 to 10 percent slopes, moderately eroded.
Medary silt loam, 10 to 15 percent slopes, moderately eroded.
Rozetta silt loam, 6 to 10 percent slopes.
Rozetta silt loam, 6 to 10 percent slopes, moderately eroded.
Seaton silt loam, 6 to 10 percent slopes, moderately eroded.
Seaton silt loam, 10 to 15 percent slopes.
Seaton silt loam, 10 to 15 percent slopes, moderately eroded.
Tama silt loam, 2 to 6 percent slopes, severely eroded.
Tama silt loam, 6 to 10 percent slopes, moderately eroded.
Tama silt loam, 10 to 15 percent slopes.
Tama silt loam, 10 to 15 percent slopes, moderately eroded.

Corn, tobacco, small grains, grasses, and legumes grow well on these soils. The soils are also suited to trees and to wildlife areas. Figure 11 shows crops grown in contour strips on Fayette and Dubuque soils in this capability unit.

For soils with slopes of 2 to 6 percent, suggested conservation practices and cropping systems are:

Contour stripcropping: 2 years of row crops, 1 year of small grain, and 2 years of hay; or 1 year each of a row crop and small grain and then 2 years of hay.

Terracing: 1 year each of a row crop, small grain, and hay; or 2 years of row crops followed by 1 year each of small grain and hay.

If contour stripcropping or terracing is not used on soils with slopes of less than 6 percent, a suggested cropping system is:

1 year each of a row crop (corn or soybeans) and small grain, and then 3 years of hay.

For soils that have slopes of 6 to 15 percent, suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and small grain and 2 years of hay.

Terracing: 1 year each of a row crop, small grain, and hay.

If contour stripcropping or terracing is not used on soils with slopes of 6 to 15 percent, suggested cropping systems are:

1 year of small grain and 2 years of hay.

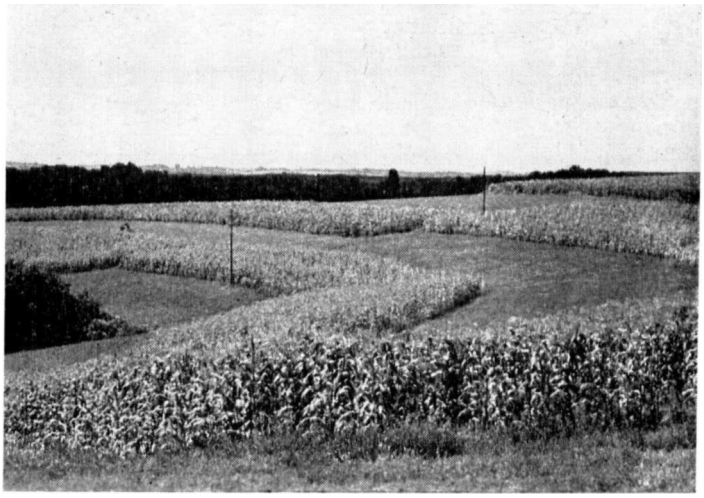

Figure 11.—**Contour stripcropping on Fayette and Dubuque soils in capability unit IIIe–1.**

1 year each of a row crop and small grain, and then 3 years of hay.

Capability unit IIIe–2

These moderately deep soils are underlain by sandstone or limestone bedrock. Most of them are silty, but some are loamy. Still others contain some stones, and most are eroded.

Because these soils are only moderately deep, further erosion permanently damages them by reducing the depth to which roots can penetrate. The soils have moderately low moisture-holding capacity. During dry periods, crops are damaged by lack of moisture. If rainfall is normal, however, and if a suitable cropping system is used, yields are moderately high. The following soils are in this unit:

Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded.
Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded.
Dubuque silt loam, 6 to 10 percent slopes.
Dubuque silt loam, 6 to 10 percent slopes, moderately eroded.
Dubuque silt loam, 10 to 15 percent slopes.
Dubuque silt loam, 10 to 15 percent slopes, moderately eroded.
Dubuque stony silt loam, 10 to 15 percent slopes.
Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded.
Gale silt loam, 2 to 10 percent slopes, severely eroded.
Hesch loam, 10 to 15 percent slopes, moderately eroded.
Hixton loam, 10 to 15 percent slopes, moderately eroded.

These soils are suited to corn, small grains, grasses, and legumes. They need practices, however, that will improve the soil structure, reduce runoff, improve the moisture-holding capacity, and help to control erosion.

Suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and small grain and 3 years of hay; or 1 year of small grain and 2 years of hay.

Terracing: 1 year each of a row crop and small grain and 2 years of hay.

If contour stripcropping or terracing is not used, a suggested cropping system is:

1 year of small grain and 3 years of hay.

Capability unit IIIw-14

Only one soil—Orion silt loam—is in this unit. This soil is somewhat poorly drained. It is on bottom lands near streams where it is flooded frequently, especially in spring.

In some places scouring, caused by floods, has removed 1½ to 2 feet of the surface soil. In other places floodwaters have deposited sand, silt, cobblestones, and similar materials on the soil. Using dikes or ditches to protect the soil will help to reduce damage by scouring. Some areas that require drainage can be drained by surface ditches.

This soil is slow to warm in spring, and late-maturing crops are likely to be damaged by frost in fall. The soil is suited only to early maturing varieties of corn and to small grains, hay, and other crops that do not need a long growing season. The soil is not well suited to alfalfa, but alfalfa can be grown if the areas are drained adequately by ditches. Alsike or ladino clover can be grown instead of alfalfa.

Capability unit IIIs-2

The soils in this capability unit are moderately deep and are sandy and loamy. They are underlain by loose sand or by sandstone bedrock. The soils are droughty and are likely to be eroded by wind and water. The following soils are in this unit:

Dakota fine sandy loam, 0 to 2 percent slopes.
Dakota fine sandy loam, 2 to 6 percent slopes.
Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded.
Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded.
Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded.
Meridian fine sandy loam, 0 to 2 percent slopes.
Meridian fine sandy loam, 2 to 6 percent slopes.
Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded.
Meridian loam, 6 to 10 percent slopes, moderately eroded.
Meridian loam, 10 to 15 percent slopes, moderately eroded.

These soils are suited to all of the cultivated crops commonly grown in the county. They are also suited to pasture and trees and can be used as wildlife areas.

Keeping the surface rough or a mulch of crop residues on the soils will help to prevent blowing and will help to prevent losses of moisture. The soils are less likely to blow if crop residues and green-manure crops are turned under and large amounts of barnyard manure are added. Shelterbelts, if located in suitable places, will also help to prevent damage by wind. The steeper soils need to have organic matter added more frequently than the less sloping soils. Contour stripcropping, terraces, diversion ditches, and other supporting conservation practices are also necessary on the steeper soils. In addition, adequate amounts of fertilizer will need to be applied, and the cropping system should include meadow crops.

During periods of low rainfall, these soils respond well to supplemental irrigation. If they are irrigated, larger amounts of fertilizer are required, however, than are generally used.

For soils that have slopes of less than 6 percent, suggested conservation practices and cropping systems are:

Contour stripcropping: 2 years of row crops, 1 year of small grain, and 2 years of hay; or 1 year each of a row crop and small grain, and then 2 years of hay.
Terracing: 1 year each of a row crop, small grain, and hay; or 2 years of row crops followed by 1 year each of small grain and hay.

If contour stripcropping or terracing is not used on soils that have slopes of 2 to 6 percent, a suggested cropping system is:

1 year each of a row crop and small grain, and then 3 years of hay.

For soils that have slopes of 6 to 15 percent, suggested conservation practices and cropping systems are:

Contour stripcropping: 1 year each of a row crop and small grain and 2 years of hay.
Terracing: 1 year each of a row crop, small grain, and hay.

If contour stripcropping or terracing is not used on soils that have slopes of 6 to 15 percent, suggested cropping systems are:

1 year of small grain and 2 years of hay.
1 year each of a row crop and small grain, and then 3 years of hay.

Capability unit IVe-1

The soils in this capability unit are deep and silty. They are well drained to moderately well drained. These soils are moderate in moisture-supplying capacity and are moderate to high in fertility. Because of their strong slopes, these soils are subject to severe erosion and resultant losses of plant nutrients if they are not protected. The following soils are in this unit:

Dodgeville silt loam, deep, 15 to 20 percent slopes.
Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded.
Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded.
Downs silt loam, 10 to 15 percent slopes, severely eroded.
Dubuque silt loam, deep, 15 to 20 percent slopes.
Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded.
Dubuque soils, deep, 6 to 10 percent slopes, severely eroded.
Dubuque soils, deep, 10 to 15 percent slopes, severely eroded.
Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded.
Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded.
Fayette silt loam, uplands, 15 to 20 percent slopes.
Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded.
Fayette silt loam, valleys, 15 to 20 percent slopes.
Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded.
Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded.
Medary soils, 6 to 10 percent slopes, severely eroded.
Seaton silt loam, 6 to 10 percent slopes, severely eroded.
Seaton silt loam, 10 to 15 percent slopes, severely eroded.
Seaton silt loam, 15 to 20 percent slopes.
Seaton silt loam, 15 to 20 percent slopes, moderately eroded.
Tama silt loam, 6 to 10 percent slopes, severely eroded.
Tama silt loam, 10 to 15 percent slopes, severely eroded.

The soils in this unit are suited to corn, small grains, and hay. They are also suitable for trees and as wildlife areas.

These soils require careful management to maintain the supply of plant nutrients. Crops respond well if

lime and a complete fertilizer are added. If tilled crops are grown, contour stripcropping can be used to control erosion. Diversion terraces can also be used to protect the soils, especially on long slopes. They will also protect tilled fields from runoff from higher lying, overgrazed pastures.

Suggested cropping systems and conservation practices for soils that have slopes of less than 15 percent are:

Contour stripcropping: 1 year each of a row crop and small grain and 3 years of hay.

Terracing: 1 year each of a row crop and small grain and 2 years of hay. Diversion terraces can be substituted for gradient terraces.

If contour stripcropping or terracing is not used, the cropping system should consist of small grain and hay.

A suggested cropping system and conservation practice for soils that have slopes of more than 15 percent is:

Contour stripcropping: 1 year each of a row crop and small grain and 3 years of hay.

If contour stripcropping is not used, the cropping system should consist of small grain and hay.

Capability unit IVe-2

The soils in this capability unit are silty or loamy and are underlain by sandstone or limestone at depths between 2 and 3 feet. Because the soils are fairly shallow, they have a moderately low moisture-supplying capacity. Runoff is likely to cause permanent damage to these soils through erosion. The following soils are in this unit:

Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded.
Dodgeville soils, 6 to 10 percent slopes, severely eroded.
Dodgeville soils, 10 to 15 percent slopes, severely eroded.
Dubuque silt loam, 15 to 20 percent slopes.
Dubuque silt loam, 15 to 20 percent slopes, moderately eroded.
Dubuque soils, 6 to 10 percent slopes, severely eroded.
Dubuque soils, 10 to 15 percent slopes, severely eroded.
Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded.
Gale silt loam, 10 to 15 percent slopes, moderately eroded.
Gale silt loam, 10 to 15 percent slopes, severely eroded.
Gale silt loam, 15 to 20 percent slopes, moderately eroded.
Hesch loam, 15 to 20 percent slopes, moderately eroded.
Hixton loam, 10 to 15 percent slopes, severely eroded.
Hixton loam, 15 to 20 percent slopes, moderately eroded.

The soils in this unit are suited to small grains and hay. They are also suited to trees and to use as wildlife areas.

Planting close-growing crops will help to prevent erosion. Applying lime and fertilizer will help to maintain high yields and provide some further protection from erosion. If the soils are used for tilled crops, the crops should be planted in contour strips using the wheel-track method. The content of organic matter and the supply of plant nutrients need to be kept high. Also, diversion terraces are required in most places.

Suggested cropping systems and conservation practices for soils that have slopes of less than 15 percent are:

Contour stripcropping: 1 year each of a row crop and small grain, and then 3 years of hay.

Contour stripcropping and wheel-track planting: 1 year each of a row crop and small grain, and then 2 years of hay.

If contour stripcropping and wheel-track planting are not used, the cropping system should consist of small grain and hay.

Suggested cropping systems and conservation practices for soils that have slopes of more than 15 percent are:

Contour stripcropping: 1 year each of a row crop and small grain, and then 4 years of hay.

Contour stripcropping and wheel-track planting: 1 year of a row crop planted in wheel tracks with alfalfa interseeded at the last time the row crop is cultivated, followed by 3 years of hay.

If no conservation practices are used, the cropping system should consist of small grain and hay.

Capability unit IVe-7

The soils in this unit are moderately deep sandy loams that are underlain by fine sand. They are somewhat excessively drained. These soils are moderately low in fertility and in moisture-supplying capacity. The following soils are in this unit:

Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded.
Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded.
Lamont fine sandy loam, 15 to 20 percent slopes.
Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded.

The soils in this unit are suited to corn, small grains, and hay. They are also suited to trees and to use as wildlife areas.

These soils have sandy surface layers. Adding organic matter frequently will help to make the soils porous so that water can penetrate readily. As a result, runoff and erosion will be reduced. Also, diversion terraces are needed on most fields where tilled crops are grown.

If conservation practices are used, a suggested cropping system is:

Contour stripcropping: A row crop planted in wheel tracks with alfalfa interseeded when the row crop is cultivated for the last time.

If contour stripcropping is not used, a suggested cropping system is 3 years of small grains and hay.

Capability unit IVs-2

Except for Sogn silt loam, 2 to 10 percent slopes, moderately eroded, the soils of this unit are all fine sandy loams. The soils are well drained to excessively drained. Some are underlain by sandy outwash, and some by sandstone or limestone. These soils have moderately low moisture-holding capacity. Crops that grow on them are damaged by drought during prolonged periods of dry weather. The following soils are in this unit:

Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded.
Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded.
Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded.
Hixton fine sandy loam, 10 to 15 percent slopes.
Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded.
Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded.
Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded.
Sogn silt loam, 2 to 10 percent slopes, moderately eroded.

These soils can be used to grow corn, small grains, and hay, and all of the soils but the Sogn are suited to trees. They are also well suited to use as wildlife areas. The soils need to have organic matter added regularly to help protect them from blowing. The organic matter will also improve the tilth of the soil and will increase the moisture-holding capacity. It can be supplied by returning crop residues to the field, by adding barnyard manure, by turning under a crop for green manure, or by using a cropping system that contains a high proportion of grasses and legumes.

Suggested conservation practices and cropping systems for soils other than the Sogn soil are:

Contour stripcropping: 1 year each of corn and small grain and 3 years of hay. On long slopes diversion terraces can be used to help reduce erosion.

Terracing: 1 year each of corn and of small grain and 2 years of hay.

If contour stripcropping and terracing are not used, a suitable cropping system is:

1 year of small grain and 3 years of hay.

The Sogn soil cannot be terraced and should be kept in small grain and hay.

Capability unit IVs–3

The soils of this unit are deep and are excessively drained. They are sandy, but in some areas their subsoils contain bands of heavier material. All of these soils dry out rapidly. If not protected, they are subject to wind erosion. The soils are badly leached because plant nutrients and moisture move readily downward through the profile. The following soils are in this unit:

Sparta loamy fine sand, 0 to 2 percent slopes.
Sparta loamy fine sand, 0 to 2 percent slopes, eroded.
Sparta loamy fine sand, 2 to 6 percent slopes.
Sparta loamy fine sand, 2 to 6 percent slopes, eroded.
Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes.

These soils can be used to grow corn, small grains, and hay, and they are suited to trees. They are also well suited to use as wildlife areas.

Most of the soils need fertilizer. The nearly level areas need shelterbelts and wind stripcropping. Corn and small grain grown on these soils respond to applications of a complete fertilizer. Applications of a fertilizer that contains a high proportion of potash and some boron may be used each year to topdress legume-grass mixtures used in hayfields. Permanent bluegrass pastures can be made more resistant to erosion by applying fertilizer. In the pastured areas adequate fertilization and protection against overgrazing are necessary from about August 15 to September 30 to keep good stands of grass.

Suggested conservation practices and cropping systems are:

Contour or wind stripcropping: 1 year each of corn and small grain and 2 years of hay.

If contour or wind stripcropping is not used, a suitable cropping system consists of 3 years of small grains and hay.

Figure 12.—**Alluvial land used for pasture; this land type is in capability unit Vw–1.**

Capability unit Vw–1

One miscellaneous land type—Alluvial land—is in this capability unit. It is a mixture of nearly level silty, sandy, or gravelly soils that are poorly drained. This land type occurs on flood plains where it is likely to be flooded by overflow from the streams. Areas that are on the flood plains of the Wisconsin and Mississippi Rivers are made up mainly of coarse sand that is low in fertility. The areas on the flood plains of tributary streams, however, consist largely of fine-textured materials. In all of the areas, the water table is high.

Protecting these areas from overflow or providing enough drainage to grow tilled crops is generally not economical. The areas are best used for pasture (fig. 12) or trees. Some pastured areas can be protected from overflow and then fertilized and renovated.

Areas that are in trees require protection from fire and from grazing. Replanting desirable kinds of trees is somewhat restricted; therefore, if feasible, desirable species should be encouraged to grow. Suggestions for replanting can be obtained from the farm forester, county agent, or soil conservationist.

These areas are well suited to use as wildlife areas. Plantings for wildlife will provide cover and winter food for many kinds of animals. In some areas that are along the Mississippi River, dikes can be used to control the level of the water and to improve the areas for waterfowl and fur-bearing animals. The marshy areas, where various kinds of grasses and sedges grow, require protection from fire.

Capability unit VIe–1

This unit consists chiefly of silty or loamy soils that are underlain by sand, sandstone, limestone, or residual clay from limestone. Some of the soils are too stony to farm, and some, although deep, are severely eroded; except for these, the moisture-holding capacity of the soils is fair. The following soils are in this mapping unit:

Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded.

Dubuque silt loam, 20 to 30 percent slopes.
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.
Dubuque silt loam, deep, 20 to 30 percent slopes.
Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded.
Dubuque soils, 15 to 20 percent slopes, severely eroded.
Dubuque soils, deep, 15 to 20 percent slopes, severely eroded.
Dubuque stony silt loam, 20 to 30 percent slopes.
Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded.
Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded.
Fayette silt loam, uplands, 20 to 30 percent slopes.
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded.
Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded.
Fayette silt loam, valleys, 20 to 30 percent slopes.
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded.
Gale silt loam, 15 to 20 percent slopes, severely eroded.
Gale silt loam, 20 to 30 percent slopes.
Gale silt loam, 20 to 30 percent slopes, moderately eroded.
Hixton loam, 15 to 20 percent slopes, severely eroded.
Hixton loam, 20 to 30 percent slopes.
Hixton loam, 20 to 30 percent slopes, moderately eroded.
Seaton silt loam, 15 to 20 percent slopes, severely eroded.
Seaton silt loam, 20 to 45 percent slopes.
Seaton silt loam, 20 to 45 percent slopes, moderately eroded.
Sogn loam, 10 to 15 percent slopes.
Sogn loam, 10 to 15 percent slopes, moderately eroded.
Sogn silt loam, 10 to 15 percent slopes.
Sogn silt loam, 10 to 15 percent slopes, moderately eroded.
Terrace escarpments, medium textured.

The soils in this unit are well suited to trees and to use as wildlife areas. Although hay or pasture crops grow well, most areas need to be fertilized and reseeded to obtain high yields and to provide a sod that is more resistant to erosion. On the stony soils machinery cannot be used for pasture improvement.

Some of the soils in this unit are in trees. Some of the woodlands are pastured, although they are not suitable for pasture and provide only poor-quality forage. Grazing and trampling of these areas by livestock cause a serious hazard of erosion. Livestock damage the young trees so that future forests are destroyed; they form trails on the steeper soils where runoff concentrates and forms gullies. The gullies advance into less sloping areas that are suitable for tilled crops.

Brush and trees should be cleared from wooded areas that are needed for pasture. Grasses and legumes can then be seeded without their growth being hindered by shade from the trees.

If the soils are kept in trees, the areas can be managed according to suggestions in the subsection, Woodland. Good management improves the yields of woodland. Also, if the woodlands are well managed, runoff is reduced and damage from erosion to fields below the woodlands is lessened; flooding of streams in the bottom lands is also reduced.

Capability unit VIs–1

The soils in this unit consist mainly of sloping to very steep, sandy, stony, or rocky soils. Most of these soils have moderately low to low moisture-supplying capacity. They are subject to severe erosion unless a protective cover of grass or trees is kept on them. The following soils are in this unit:

Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded.
Hesch fine sandy loam, 15 to 20 percent slopes.
Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded.
Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded.
Hixton fine sandy loam, 15 to 20 percent slopes.
Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded.
Lamont fine sandy loam, 20 to 45 percent slopes.
Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded.
Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded.
Stony colluvial land.
Stony rock land, steep.

The soils in this unit are not suited to tilled crops, but they are suited to pasture, trees, or to use as wildlife areas.

Machinery cannot be used on the stony or very steep soils to help improve the areas for pasture. Otherwise, these soils can be used and managed about the same as the soils in capability unit VIe–1. Yields will be lower, however, because these soils have a lower moisture-supplying capacity.

Capability unit VIIe–1

The soils in this unit are moderately shallow to deep. They are silty or stony and have steep slopes. Most of the soils have moderate to high moisture-supplying capacity. The soils are subject to severe erosion unless a protective cover of trees or grass is kept on them. The following soils are in this unit:

Dubuque silt loam, 30 to 45 percent slopes.
Dubuque silt loam, deep, 30 to 45 percent slopes.
Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded.
Dubuque soils, 20 to 30 percent slopes, severely eroded.
Dubuque soils, deep, 20 to 30 percent slopes, severely eroded.
Dubuque stony silt loam, 30 to 45 percent slopes.
Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded.
Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded.

The soils in this unit are best suited to trees. They can be used for pasture if they are managed carefully.

If the soils are pastured, grazing should be controlled so that grass is kept on the areas throughout the year. Suggestions for controlling erosion in the wooded areas can be found in the subsection, Woodland.

Capability unit VIIs–1

Some of the soils in this unit are sandy or stony, and some are shallow. Some of them are severely eroded, or droughty, or have other serious limitations. The moisture-supplying capacity is too low in the sandy soils to keep a cover of sod growing. The shallow or rocky soils also have a low moisture-supplying capacity. The following soils are in this unit:

Chelsea fine sand, 0 to 6 percent slopes, eroded.
Chelsea fine sand, 6 to 10 percent slopes, eroded.
Chelsea fine sand, 10 to 15 percent slopes, eroded.
Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded.
Hesch fine sandy loam, 20 to 45 percent slopes.
Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded.
Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded.

Hixton fine sandy loam, 20 to 30 percent slopes.
Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded.
Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded.
Hixton fine sandy loam, 30 to 45 percent slopes.
Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded.
Sogn loam, 15 to 20 percent slopes, moderately eroded.
Sogn silt loam, 15 to 20 percent slopes.
Sogn silt loam, 15 to 20 percent slopes, moderately eroded.
Sparta fine sand and Blown-out land, 6 to 15 percent slopes.
Sparta fine sand and Dune land, 6 to 15 percent slopes.
Sparta loamy fine sand, 6 to 15 percent slopes.
Stony rock land, very steep.
Terrace escarpments, coarse textured.

The sandy soils are best suited to pine trees and to use as wildlife areas. On the sandy soils that have gentle slopes, trees can be planted with a mechanical planter. Stony rock land, very steep, is best suited to hardwoods.

The silty soils need protection from water erosion. The sandy soils need protection from both wind and water erosion.

Capability unit VIIIw-1

This unit consists of only one land type—Marsh. Marsh is made up of very wet soils that are flooded most of the year. On these wet soils grow cattails, bulrushes, and other plants suited to shallow water. The soils are not suitable for pasture or trees but are well suited to wildlife and for use as recreational areas.

These soils can be improved for ducks, muskrats, and other wildlife by building ditches to control the water level. The areas will need protection from fire in dry seasons when the vegetation will burn.

Consult the State Conservation Department or the local representative of the Soil Conservation Service for help in developing the areas for wildlife and recreation.

Estimated Yields

The estimated average acre yields of the principal crops obtained on each soil in Grant County are listed in table 3. These estimates are based on interviews with farmers; on the results obtained by the agricultural experiment station on test plots located within the county; and on observations made by soil surveyors, work unit conservationists, and other agricultural workers who are familiar with the soil.[4]

[4] KLINGELHOETS, A. J. PRODUCTIVITY RATINGS FOR SOILS OF CRAWFORD, GRANT, AND RICHLAND COUNTIES, WISCONSIN. 1948. [Unpublished thesis, Univ. of Wis.]

TABLE 3.—*Estimated average acre yields of the principal crops*

[Estimated yields in columns A are those obtained under management practices now used by most of the farmers in the county; yields in columns B are yields obtained under improved management. Dashes indicate the soil is not suitable or the crop is rarely grown]

Soil	Corn (grain)		Corn (silage)		Oats (grain)		Clover-timothy hay		Alfalfa-brome hay		Permanent pasture (bluegrass)	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Alluvial land [2]	-----	60	-----	10.5	----	50	-----	2.0	-----	----	55	100
Arenzville silt loam	60	85	10.5	12.0	52	65	2.0	2.5	3.2	3.8	110	140
Atterberry silt loam, 0 to 2 percent slopes [2]	50	75	10.0	11.5	50	65	1.8	2.4	-----	3.5	90	125
Atterberry silt loam, 2 to 6 percent slopes	50	75	10.0	11.5	50	65	1.8	2.4	-----	3.5	90	125
Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded	60	80	10.5	11.5	55	70	1.9	2.5	-----	3.6	95	135
Bertrand silt loam, 0 to 2 percent slopes	60	90	10.5	12.0	57	70	2.0	2.5	3.0	3.5	95	130
Bertrand silt loam, 2 to 6 percent slopes	60	90	10.5	12.0	55	70	2.0	2.5	3.0	3.5	95	130
Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	55	87	10.5	12.0	50	68	1.8	2.4	2.8	3.3	85	120
Bertrand silt loam, 6 to 10 percent slopes	55	90	10.5	12.0	50	70	1.9	2.4	2.8	3.5	90	120
Bertrand silt loam, 6 to 10 percent slopes, moderately eroded	50	85	10.0	12.0	45	65	1.8	2.4	2.5	3.2	85	120
Bertrand silt loam, 10 to 15 percent slopes, moderately eroded	45	80	9.0	11.5	45	65	1.6	2.3	2.4	3.1	75	115
Chaseburg silt loam, 0 to 3 percent slopes	65	90	11.0	12.0	58	75	2.1	2.6	3.1	3.7	110	145
Chaseburg silt loam, 3 to 6 percent slopes	65	88	11.0	12.0	55	70	2.0	2.5	3.0	3.6	105	140
Chaseburg silt loam, 6 to 15 percent slopes	60	85	10.5	12.0	50	68	1.8	2.4	3.0	3.5	95	130
Chelsea fine sand, 0 to 6 percent slopes, eroded	-----	-----	-----	-----	----	----	-----	-----	-----	-----	20	35
Chelsea fine sand, 6 to 10 percent slopes, eroded	-----	-----	-----	-----	----	----	-----	-----	-----	-----	20	35
Chelsea fine sand, 10 to 15 percent slopes, eroded	-----	-----	-----	-----	----	----	-----	-----	-----	-----	20	35
Curran silt loam [2]	50	75	10.0	11.5	50	65	1.8	2.4	-----	3.2	95	125
Dakota fine sandy loam, 0 to 2 percent slopes	55	75	10.5	11.5	47	62	1.8	2.2	2.5	3.0	85	110
Dakota fine sandy loam, 2 to 6 percent slopes	55	70	10.5	11.0	45	60	1.7	2.2	2.5	3.0	80	110
Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded	47	65	9.5	11.0	40	58	1.5	2.1	2.2	2.7	70	105
Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded	55	80	10.5	11.5	50	65	1.7	2.2	2.2	3.0	80	110
Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded	52	75	10.0	11.5	43	60	1.6	2.1	2.1	2.9	75	105
Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded	40	58	8.0	10.5	38	53	1.4	2.0	1.8	2.6	65	100
Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded	-----	-----	-----	-----	----	----	-----	-----	-----	-----	60	95

See footnotes at end of table.

TABLE 3.—*Estimated average acre yields of the principal crops*—Continued

Soil	Corn (grain)		Corn (silage)		Oats (grain)		Clover-timothy hay		Alfalfa-brome hay		Permanent pasture (bluegrass)	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded	60	90	10. 5	12. 0	50	68	2. 0	2. 5	3. 0	3. 5	100	130
Dodgeville silt loam, deep, 6 to 10 percent slopes	60	90	10. 5	12. 0	52	68	1. 9	2. 5	3. 0	3. 5	95	130
Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded	55	85	10. 5	12. 0	50	65	1. 8	2. 3	2. 8	3. 3	90	120
Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded	50	80	10. 0	11. 5	48	65	1. 8	2. 3	2. 4	3. 1	90	120
Dodgeville silt loam, deep, 15 to 20 percent slopes	50	80	10. 0	11. 5	45	62	1. 7	2. 2	2. 7	3. 2	80	115
Dodgeville soils, 6 to 10 percent slopes, severely eroded	50	70	10. 0	11. 0	40	58	1. 6	2. 0	2. 0	2. 8	75	100
Dodgeville soils, 10 to 15 percent slopes, severely eroded							1. 5	2. 0	1. 8	2. 6	70	100
Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded	55	80	10. 5	11. 5	45	65	1. 8	2. 4	2. 5	3. 2	90	120
Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded	47	75	9. 5	11. 5	45	63	1. 7	2. 2	2. 3	3. 0	80	110
Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded							1. 5	2. 1	2. 2	2. 8	70	110
Downs silt loam, 2 to 6 percent slopes, moderately eroded	62	95	10. 5	12. 5	55	70	2. 0	2 6	3. 0	3. 5	100	140
Downs silt loam, 2 to 6 percent slopes, severely eroded	55	85	10. 5	12. 0	50	68	1. 8	2. 5	2. 5	3. 2	90	130
Downs silt loam, 6 to 10 percent slopes	60	90	10. 5	12. 0	50	68	1. 9	2. 5	3. 0	3. 5	95	130
Downs silt loam, 6 to 10 percent slopes, moderately eroded	58	85	10. 5	12. 0	48	65	1. 8	2. 5	2. 7	3. 2	90	125
Downs silt loam, 10 to 15 percent slopes, moderately eroded	50	75	10. 0	11. 5	45	60	1. 7	2. 3	2. 5	3. 0	85	120
Downs silt loam, 10 to 15 percent slopes, severely eroded							1. 5	2. 2	2. 2	3. 0	75	110
Dubuque silt loam, 2 to 6 percent slopes	50	75	10. 0	11. 5	40	60	1. 5	2. 0	2. 2	3. 0	70	100
Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	45	73	9. 0	11. 0	35	58	1. 4	1. 9	2. 0	2. 8	65	95
Dubuque silt loam, 6 to 10 percent slopes	48	75	9. 5	11. 5	38	60	1. 4	2. 0	2. 1	2. 8	65	100
Dubuque silt loam, 6 to 10 percent slopes, moderately eroded	45	70	9. 0	11. 0	35	55	1. 2	1. 8	2. 0	2. 7	55	90
Dubuque silt loam, 10 to 15 percent slopes	40	65	8. 0	11. 0	35	55	1. 3	1. 7	2. 0	2. 8	60	85
Dubuque silt loam, 10 to 15 percent slopes, moderately eroded	35	60	7. 0	10. 5	30	50	1. 0	1. 6	1. 8	2. 5	45	80
Dubuque silt loam, 15 to 20 percent slopes	30	55	6. 0	10. 5	30	50	1. 0	1. 5	1. 8	2. 5	45	75
Dubuque silt loam, 15 to 20 percent slopes, moderately eroded	28	50	5. 5	10. 0	28	45	. 8	1. 4	1. 6	2. 4	35	70
Dubuque silt loam, 20 to 30 percent slopes							1. 0	1. 5	1. 6	2. 4	40	75
Dubuque silt loam, 20 to 30 percent slopes, moderately eroded							. 8	1. 4	1. 5	2. 2	35	70
Dubuque silt loam, 30 to 45 percent slopes												
Dubuque silt loam, deep, 2 to 6 percent slopes	60	90	10. 5	12. 0	50	65	1. 8	2. 5	2. 8	3. 3	85	130
Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	55	85	10. 5	12. 0	48	65	1. 7	2. 3	2. 5	3. 2	80	120
Dubuque silt loam, deep, 6 to 10 percent slopes	58	85	10. 5	12. 0	50	65	1. 8	2. 5	2. 5	3. 2	85	130
Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded	55	80	10. 5	11. 5	45	63	1. 7	2. 3	2. 3	3. 0	80	120
Dubuque silt loam, deep, 10 to 15 percent slopes	50	80	10. 0	11. 5	45	65	1. 7	2. 4	2. 3	3. 1	80	120
Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded	45	70	9. 0	11. 0	40	60	1. 6	2. 2	2. 2	3. 0	75	110
Dubuque silt loam, deep, 15 to 20 percent slopes	45	70	9. 0	11. 0	40	65	1. 6	2. 2	2. 2	2. 8	75	110
Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded	40	65	8. 0	11. 0	35	55	1. 5	2. 2	2. 0	2. 5	70	110
Dubuque silt loam, deep, 20 to 30 percent slopes							1. 5	2. 0	2. 0	2. 6	70	100
Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded							1. 3	1. 8	1. 8	2. 5	60	90
Dubuque silt loam, deep, 30 to 45 percent slopes											65	95
Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded											60	85
Dubuque soils, 6 to 10 percent slopes, severely eroded	35	60	7. 0	10. 5	30	50	1. 0	1. 5	1. 8	2. 4	45	75
Dubuque soils, 10 to 15 percent slopes, severely eroded							. 9	1. 5	1. 5	2. 2	40	75
Dubuque soils, 15 to 20 percent slopes, severely eroded							. 6	1. 2	1. 4	2. 0	30	60
Dubuque soils, 20 to 30 percent slopes, severely eroded											25	55
Dubuque soils, deep, 2 to 6 percent slopes, severely eroded	45	75	9. 0	11. 5	40	60	1. 5	2. 1	2. 0	3. 0	70	105
Dubuque soils, deep, 6 to 10 percent slopes, severely eroded	45	75	9. 0	11. 5	40	60	1. 5	2. 1	2. 0	2. 8	70	105
Dubuque soils, deep, 10 to 15 percent slopes, severely eroded							1. 4	2. 1	2. 0	2. 8	65	105
Dubuque soils, deep, 15 to 20 percent slopes, severely eroded							1. 4	2. 0	1. 8	2. 4	65	100
Dubuque soils, deep, 20 to 30 percent slopes, severely eroded											60	95
Dubuque stony silt loam, 10 to 15 percent slopes							1. 2	1. 8	1. 8	2. 4	55	90
Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded							1. 0	1. 6	1. 6	2. 2	45	80
Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded							1. 0	1. 6	1. 5	2. 0	45	80
Dubuque stony silt loam, 20 to 30 percent slopes												
Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded												

See footnotes at end of table.

TABLE 3.—*Estimated average acre yields of the principal crops*—Continued

Soil	Corn (grain)		Corn (silage)		Oats (grain)		Clover-timothy hay		Alfalfa-brome hay		Permanent pasture (bluegrass)	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Dubuque stony silt loam, 30 to 45 percent slopes												
Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	55	85	10.5	12.0	50	70	1.8	2.4	2.8	3.3	85	120
Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded	45	78	9.0	11.5	48	68	1.7	2.3	2.5	3.2	80	115
Fayette silt loam, uplands, 6 to 10 percent slopes	58	90	10.5	12.0	50	70	1.8	2.5	2.8	3.5	85	130
Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded	55	82	10.5	11.5	48	65	1.7	2.3	2.6	3.2	80	115
Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded	47	78	9.5	11.5	42	60	1.6	2.2	2.4	3.1	75	110
Fayette silt loam, uplands, 10 to 15 percent slopes	50	80	10.0	11.5	45	65	1.7	2.4	2.5	3.0	80	120
Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded	45	75	9.0	11.5	40	60	1.6	2.3	2.4	3.1	75	115
Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded							1.5	2.2	2.2	2.8	70	110
Fayette silt loam, uplands, 15 to 20 percent slopes	45	72	9.0	11.0	40	65	1.6	2.3	2.4	3.0	75	115
Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded	40	70	8.0	11.0	38	60	1.5	2.3	2.3	2.8	70	115
Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded							1.4	2.2	2.0	2.7	65	110
Fayette silt loam, uplands, 20 to 30 percent slopes							1.5	2.1	2.2	2.8	70	105
Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded							1.4	2.0	2.0	2.6	65	100
Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded											55	95
Fayette silt loam, valleys, 6 to 10 percent slopes	60	90	10.5	12.0	50	75	2.0	2.6	3.0	3.6	95	140
Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded	55	85	10.5	12.0	45	70	1.8	2.5	2.8	3.5	85	130
Fayette silt loam, valleys, 10 to 15 percent slopes	55	80	10.5	11.5	45	68	1.8	2.5	2.8	3.3	85	130
Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded	50	78	10.0	11.5	40	65	1.7	2.4	2.5	3.2	80	120
Fayette silt loam, valleys, 15 to 20 percent slopes	48	75	9.5	11.5	40	65	1.7	2.3	2.4	3.0	80	115
Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded	45	72	9.0	11.0	38	62	1.6	2.3	2.3	2.8	75	115
Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded							1.4	2.2	2.1	2.7	65	110
Fayette silt loam, valleys, 20 to 30 percent slopes							1.5	2.2	2.2	2.8	70	110
Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded							1.4	2.1	2.1	2.7	65	105
Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded											55	95
Gale silt loam, 2 to 10 percent slopes	55	80	10.5	11.5	45	65	1.5	2.0	2.0	2.6	70	100
Gale silt loam, 2 to 10 percent slopes, moderately eroded	50	76	10.0	11.5	40	58	1.4	1.8	1.8	2.4	65	90
Gale silt loam, 2 to 10 percent slopes, severely eroded	40	60	8.0	10.5	35	50	1.2	1.6	1.6	2.2	55	80
Gale silt loam, 10 to 15 percent slopes, moderately eroded	45	65	9.0	11.0	40	55	1.3	1.8	1.6	2.2	60	90
Gale silt loam, 10 to 15 percent slopes, severely eroded							1.0	1.5	1.4	2.0	45	75
Gale silt loam, 15 to 20 percent slopes, moderately eroded	42	60	8.5	10.5	38	50	1.2	1.7	1.5	2.1	55	85
Gale silt loam, 15 to 20 percent slopes, severely eroded							1.0	1.4	1.3	1.8	45	70
Gale silt loam, 20 to 30 percent slopes							1.3	1.7	1.5	2.0	60	85
Gale silt loam, 20 to 30 percent slopes, moderately eroded							1.1	1.5	1.3	1.8	50	75
Garwin silty clay loam [2]		105		12.5	35	70		2.7		3.8	70	145
Hesch loam, 2 to 10 percent slopes, moderately eroded	50	80	10.0	11.5	40	58	1.4	1.8	1.8	2.4	65	90
Hesch loam, 10 to 15 percent slopes, moderately eroded	48	75	9.5	11.5	38	55	1.3	1.7	1.7	2.2	60	85
Hesch loam, 15 to 20 percent slopes, moderately eroded	45	70	9.0	11.0	35	50	1.2	1.7	1.6	2.1	55	85
Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded	45	65	9.0	11.0	35	50	1.3	1.7	1.6	2.2	60	85
Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded							1.0	1.5	1.5	2.0	45	75
Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded											30	55
Hesch fine sandy loam, 15 to 20 percent slopes							.9	1.5	1.5	2.0	40	75
Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded							.8	1.3	1.3	1.8	35	65
Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded											25	45
Hesch fine sandy loam, 20 to 45 percent slopes											35	60
Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded											25	45

See footnotes at end of table.

TABLE 3.—*Estimated average acre yields of the principal crops*—Continued

Soil	Corn (grain)		Corn (silage)		Oats (grain)		Clover-timothy hay		Alfalfa-brome hay		Permanent pasture (bluegrass)	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Hixton loam, 2 to 10 percent slopes	45	70	9.0	11.0	38	55	1.3	1.7	1.8	2.4	60	85
Hixton loam, 2 to 10 percent slopes, moderately eroded	40	60	8.0	10.5	35	50	1.1	1.5	1.7	2.1	50	75
Hixton loam, 10 to 15 percent slopes, moderately eroded	38	58	8.5	10.5	33	48	1.0	1.5	1.6	2.0	45	75
Hixton loam, 10 to 15 percent slopes, severely eroded							.8	1.3	1.4	1.7	35	65
Hixton loam, 15 to 20 percent slopes, moderately eroded	35	55	7.0	10.5	30	45	.9	1.5	1.5	1.8	40	75
Hixton loam, 15 to 20 percent slopes, severely eroded							.8	1.3	1.2	1.6	35	65
Hixton loam, 20 to 30 percent slopes							.8	1.5	1.4	1.7	35	75
Hixton loam, 20 to 30 percent slopes, moderately eroded							.7	1.3	1.3	1.6	30	65
Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded	42	62	8.5	10.5	38	50	1.2	1.6	1.6	2.1	55	75
Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded	40	60	8.0	10.5	35	50	1.2	1.6	1.5	2.0	55	75
Hixton fine sandy loam, 10 to 15 percent slopes							1.0	1.5	1.5	1.9	45	70
Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded							.8	1.4	1.4	1.8	35	65
Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded											25	50
Hixton fine sandy loam, 15 to 20 percent slopes							.7	1.3	1.4	1.7	30	60
Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded							.6	1.2	1.2	1.5	25	50
Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded												
Hixton fine sandy loam, 20 to 30 percent slopes												
Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded												
Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded												
Hixton fine sandy loam, 30 to 45 percent slopes												
Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded												
Jackson silt loam, 0 to 2 percent slopes	60	90	10.5	12.0	55	75	2.0	2.6	3.0	3.5	100	145
Jackson silt loam, 2 to 6 percent slopes	60	90	10.5	12.0	55	70	2.0	2.5	2.8	3.5	100	140
Jackson silt loam, 2 to 6 percent slopes, moderately eroded	58	90	10.5	12.0	50	68	1.9	2.5	2.6	3.4	95	140
Jackson silt loam, 6 to 10 percent slopes, moderately eroded	55	87	10.5	12.0	48	68	1.9	2.5	2.5	3.3	95	140
Judson silt loam, 0 to 3 percent slopes	68	100	11.0	12.5	55	70	2.2	2.6	3.2	3.7	115	150
Judson silt loam, 3 to 10 percent slopes	65	95	11.0	12.5	55	68	2.0	2.5	3.1	3.6	110	145
Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded	45	65	9.0	11.0	35	45	1.0	1.5	1.5	2.1	45	75
Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded							1.0	1.5	1.4	2.0	45	75
Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded											40	65
Lamont fine sandy loam, 15 to 20 percent slopes							1.0	1.5	1.4	2.0	45	75
Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded							.8	1.3	1.2	1.8	35	65
Lamont fine sandy loam, 20 to 45 percent slopes												
Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded												
Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded	55	82	10.5	11.5	42	65	1.8	2.4	2.8	3.4	90	125
Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded	52	80	10.0	11.5	40	65	1.7	2.4	2.6	3.3	85	125
Marsh												
Medary silt loam, 0 to 2 percent slopes [2]	45	75	9.0	11.5	45	60	1.5	2.0	1.8	2.8	75	105
Medary silt loam, 2 to 6 percent slopes, moderately eroded	42	70	8.5	11.0	42	58	1.4	1.9	1.7	2.5	70	100
Medary silt loam, 6 to 10 percent slopes, moderately eroded	42	65	8.5	11.0	40	55	1.3	1.8	1.8	2.6	65	95
Medary silt loam, 10 to 15 percent slopes, moderately eroded	40	60	8.0	10.5	38	55	1.2	1.7	1.7	2.5	60	90
Medary soils, 6 to 10 percent slopes, severely eroded	35	55	7.0	10.5	38	53	1.2	1.8	1.6	2.2	60	95
Meridian loam, 0 to 2 percent slopes	45	65	9.0	11.0	40	60	1.4	1.8	2.0	2.7	65	90
Meridian loam, 2 to 6 percent slopes	45	65	9.0	11.0	38	58	1.4	1.8	2.0	2.5	65	90
Meridian loam, 2 to 6 percent slopes, moderately eroded	40	60	8.0	10.5	35	55	1.2	1.7	1.8	2.2	55	85
Meridian loam, 6 to 10 percent slopes, moderately eroded	38	55	7.5	10.5	35	55	1.0	1.6	1.7	2.2	45	80
Meridian loam, 10 to 15 percent slopes, moderately eroded	35	50	7.0	10.0	32	55	.9	1.5	1.6	2.1	40	75
Meridian fine sandy loam, 0 to 2 percent slopes	40	60	8.0	10.5	38	50	1.2	1.6	1.8	2.4	55	80
Meridian fine sandy loam, 2 to 6 percent slopes	40	58	8.0	10.5	35	48	1.2	1.6	1.6	2.2	55	80
Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded	35	55	7.0	10.5	30	45	1.0	1.4	1.5	2.0	45	70

See footnotes at end of table.

TABLE 3.—*Estimated average acre yields of the principal crops*—Continued

Soil	Corn (grain)		Corn (silage)		Oats (grain)		Clover-timothy hay		Alfalfa-brome hay		Permanent pasture (bluegrass)	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded	33	50	6.5	10.5	28	40	1.0	1.3	1.4	1.8	45	65
Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded							.8	1.2	1.2	1.5	35	60
Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded							.8	1.3	1.3	1.7	35	65
Muscatine silt loam, 0 to 2 percent slopes	65	100	11.0	12.5	55	70	2.2	2.6		3.7	115	150
Muscatine silt loam, 2 to 6 percent slopes	65	100	11.0	12.5	55	70	2.2	2.6		3.6	115	145
Muscatine silt loam, 2 to 6 percent slopes, moderately eroded	60	95	10.5	12.5	53	68	2.1	2.5		3.4	110	135
Orion silt loam [2]	50	85	10.0	12.0	50	65	2.0	2.5		3.0	105	135
Richwood silt loam, 0 to 2 percent slopes	65	95	11.0	12.5	55	70	2.1	2.6	3.2	3.6	105	140
Richwood silt loam, 2 to 6 percent slopes	65	95	11.0	12.5	55	68	2.0	2.5	3.1	3.5	105	135
Rozetta silt loam, 6 to 10 percent slopes	58	90	10.5	12.0	55	75	2.0	2.6	3.1	3.6	100	140
Rozetta silt loam, 6 to 10 percent slopes, moderately eroded	55	87	10.5	12.0	50	75	1.9	2.5	2.8	3.5	95	130
Seaton silt loam, 2 to 6 percent slopes	55	80	10.5	11.5	50	62	1.8	2.3	2.8	3.1	85	115
Seaton silt loam, 2 to 6 percent slopes, moderately eroded	50	80	10.0	11.5	48	60	1.8	2.3	2.6	3.0	85	115
Seaton silt loam, 6 to 10 percent slopes, moderately eroded	48	78	9.5	11.5	42	58	1.7	2.2	2.5	2.8	80	110
Seaton silt loam, 6 to 10 percent slopes, severely eroded	40	65	8.0	11.0	35	50	1.5	2.0	2.3	2.6	70	100
Seaton silt loam, 10 to 15 percent slopes	48	75	9.5	11.5	45	60	1.7	2.2	2.4	2.8	80	110
Seaton silt loam, 10 to 15 percent slopes, moderately eroded	45	75	9.0	11.5	40	55	1.6	2.2	2.2	2.6	75	110
Seaton silt loam, 10 to 15 percent slopes, severely eroded							1.4	1.9	2.0	2.5	65	95
Seaton silt loam, 15 to 20 percent slopes	45	70	9.0	11.0	40	55	1.5	2.1	2.3	2.6	70	105
Seaton silt loam, 15 to 20 percent slopes, moderately eroded	40	60	8.0	10.5	35	48	1.2	2.0	2.1	2.5	55	100
Seaton silt loam, 15 to 20 percent slopes, severely eroded							1.0	1.8	1.6	2.4	45	90
Seaton silt loam, 20 to 45 percent slopes							1.0	1.6	2.0	2.6	45	80
Seaton silt loam, 20 to 45 percent slopes, moderately eroded							.8	1.5	1.8	2.4	35	75
Sogn silt loam, 2 to 10 percent slopes, moderately eroded							1.0	1.3	1.5	1.8	50	70
Sogn silt loam, 10 to 15 percent slopes											45	65
Sogn silt loam, 10 to 15 percent slopes, moderately eroded											40	60
Sogn silt loam, 15 to 20 percent slopes											45	65
Sogn silt loam, 15 to 20 percent slopes, moderately eroded											40	60
Sogn loam, 10 to 15 percent slopes											50	75
Sogn loam, 10 to 15 percent slopes, moderately eroded											45	60
Sogn loam, 15 to 20 percent slopes, moderately eroded											40	55
Sparta loamy fine sand, 0 to 2 percent slopes	30	45	6.0	9.0	25	35	.8	1.2	1.2	1.7	40	65
Sparta loamy fine sand, 0 to 2 percent slopes, eroded	28	40	6.0	8.0	22	30	.7	1.0	1.0	1.5	35	60
Sparta loamy fine sand, 2 to 6 percent slopes	28	40	6.0	8.0	22	30			1.2	1.6	40	65
Sparta loamy fine sand, 2 to 6 percent slopes, eroded	25	38	5.0	8.0	20	28			1.0	1.5	30	60
Sparta loamy fine sand, 6 to 15 percent slopes	20	35	4.0	7.0	18	25			1.1	1.6	35	55
Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes	25	40	5.0	8.0	20	30			1.0	1.5	35	60
Sparta fine sand and Dune land, 6 to 15 percent slopes											25	45
Sparta fine sand and Blown-out land, 6 to 15 percent slopes												
Stony colluvial land							1.5	2.1	2.5	3.0	75	110
Stony rock land, steep											45	45
Stony rock land, very steep												
Stronghurst silt loam, 2 to 6 percent slopes [2]	50	85	10.0	12.0	48	70	1.8	2.5		3.5	95	135
Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded	45	80	9.0	11.5	45	68	1.6	2.4		3.3	90	125
Tama silt loam, 0 to 2 percent slopes	65	95	11.0	12.5	55	70	2.2	2.6	3.2	3.6	100	140
Tama silt loam, 2 to 6 percent slopes	65	95	11.0	12.5	55	68	2.1	2.5	3.1	3.6	105	135
Tama silt loam, 2 to 6 percent slopes, moderately eroded	60	90	10.5	12.0	50	65	2.0	2.5	3.0	3.5	100	135
Tama silt loam, 2 to 6 percent slopes, severely eroded	50	80	10.0	11.5	45	60	1.8	2.4	2.8	3.4	90	125
Tama silt loam, 6 to 10 percent slopes, moderately eroded	58	85	10.5	12.0	48	65	1.8	2.4	3.0	3.5	90	130
Tama silt loam, 6 to 10 percent slopes, severely eroded	48	75	9.5	11.5	45	63	1.7	2.2	2.6	3.2	85	115
Tama silt loam, 10 to 15 percent slopes	55	82	10.5	11.5	50	65	1.8	2.4	2.8	3.3	90	125
Tama silt loam, 10 to 15 percent slopes, moderately eroded	50	80	10.0	11.5	48	65	1.8	2.3	2.6	3.0	90	120
Tama silt loam, 10 to 15 percent slopes, severely eroded							1.5	2.1	2.4	2.8	75	115
Terrace escarpments, medium textured							1.0	1.5	1.8	2.5	50	75
Terrace escarpments, coarse textured											35	55
Toddville silt loam	65	100	11.0	12.5	55	70	2.2	2.6	3.0	3.6	120	150

[1] Cow-acre-days is the term used to express the carrying capacity of pasture. This value is obtained by multiplying the number of animal units carried per acre by the number of days the pasture is grazed during a single grazing season without injury to the sod.

[2] Soil must be drained before it can be used extensively for agriculture.

In columns A are average yields obtained under the management common in the county at the time the soil survey was made. This management includes the use of barnyard manure, starter fertilizer for corn, and little or no fertilizer for small grain or hay crops. It also includes planting hybrid seed corn at the rate of about 12,000 plants an acre. A minimum amount of lime is applied for growing alfalfa. Hayfields are cut twice each year and are grazed in fall. No special practices are used in preparing the seedbed or in cultivating.

Yields in columns B are those expected if the management practices suggested under the subsection, Management by Capability Units, are used. These include applying lime and fertilizer according to amounts indicated by soil tests. For corn, larger amounts of fertilizer are applied than under common management, and fertilizer is used for small grains and hay. Suitable cropping systems are used along with timely seeding, spraying, and cultivating of crops.

For the yields in columns B, hybrid seed corn is planted at the rate of 12,000 to 18,000 plants an acre. Varieties of small grains that have been tested are seeded. If alfalfa is to be grown, enough lime is applied to bring the pH of the soil to 6.5 or 7.0; varieties of alfalfa are seeded that are resistant to wilt and to winterkill; a topdressing of manure or a commercial fertilizer is applied; the crop is harvested to get three crops a year, and there is little or no grazing of the fields. The improved management needed to get increased yields of tobacco or other special crops includes fertilizing heavily and controlling insects.

Even higher yields than those given in table 3 are possible. On some soils it will pay to make heavy applications of nitrogen, phosphate, potash, and possibly some minor elements, such as boron. Many farmers can produce more corn than 100 bushels per acre. In some places, especially on light-colored or sandy soils, split applications of nitrogen can be applied as a side dressing to corn or other cultivated crops in addition to plowing under heavy applications of a commercial fertilizer. Consult your county agent or experiment station for specific suggestions on kinds and quantities of fertilizer, and lime, and seed mixtures to use.

Woodland

This section discusses some of the uses of woodlands on farms in Grant County. It describes general management of the woodlands and tells what kinds of trees grow on certain soil types. Finally, it gives estimated potential annual acre yields of salable timber that can be obtained from well-managed stands.

Uses of woodlands.—In Grant County woodlands on farms occupy 159,864 acres, or more than one-fifth of the total acreage in farms. The woodlots provide products for sale or for use on the farm. In addition, they help to prevent erosion and give protection to wildlife.

Much of the lumber taken from farm woodlots is used in rough form on the farm and for flooring and other interior uses. Other products are sold and thus contribute to the cash income on many farms. In 1954, for example, trees were cut for fuel on 1,252 farms and for posts on 1,178 farms. Trees were cut for saw logs and veneer logs on 505 farms, and for pulpwood, on 17 farms. Of these products, most were used on the farm, but part were sold.

Management of woodlands.—The value of farm woodlots and of other wooded tracts can be increased by protecting the areas from trampling and from grazing by livestock. It can also be increased by preventing fires, removing cull trees and weed trees systematically, and thinning the trees so that the more desirable ones can grow. Grazing damages a wooded area as much as overcutting or burning. The grazing animals trample the soil and cause excessive erosion. Their browsing damages or kills the young trees and undergrowth. Furthermore, wooded areas, used for grazing, do not provide enough forage to be desirable as pasture. Experiments conducted in this county (*1*) show that 1 acre of renovated pasture yields more than 11 times as much forage as 1 acre of wooded pasture.

The management of a wooded area depends on its present condition and on the kinds of trees to be grown. If the area has been grazed heavily, replanting may be necessary. In areas that have not been grazed or that have been grazed only lightly, the cull and weed trees should be removed. In thinning, the space left around each tree should be adequate so that the remaining trees will be well shaped. The trees removed in thinning can be used for posts, for fuel, or as pulpwood.

If a large number of trees must be removed, it is best to divide the area into plots or strips. One strip can then be cleared and replanted and the trees allowed to become established before the next strip is cleared.

Kinds of trees.—Most of the trees in Grant County are hardwoods, but pines make up about 1 percent of the total stand. The stands consist mainly of oak, hickory, hard maple, basswood, elm, black walnut, white ash, aspen, paper birch, and boxelder, but there are some jack pines and redcedars. The trees are mainly on steep, stony, sandy, or wet soils that are not suited to cultivated crops. These steep, stony, and sandy soils are often too droughty for crops that have shallow root systems. If the water table is within reach of tree roots, however, the trees can often make excellent growth. Thus, a soil that is not suitable for field crops may be highly desirable for trees.

A study made of trees growing in this part of Wisconsin (*10*) indicates that certain trees grow more commonly on certain soil types. The following is a list of some of the soil types in the county and the trees that commonly grow on them:

Soil type	*Species*
Fayette-Dubuque silt loams	White, red, and black oaks, shagbark and bitternut hickories, and some hard maple, basswood, and elm.
Hixton loams	Black and bur oaks; some hickory.
Hesch loams	White oak, hard maple, basswood, black walnut, and white ash.
Curran silt loam	Black and red oaks, white and slippery elms, aspen, paper birch, and boxelder.
Chelsea fine sands	Jack pine and scrub oak.
Sogn loams and Sogn silt loams	Bur and black oaks, shagbark hickory, redcedar.

Estimated yields.—It has also been found that there is a direct relationship between the yield of lumber and the kind of soil on which trees grow. Table 4 gives the estimated potential yields of timber on the soil types and

TABLE 4.—*Estimated potential annual acre yields of salable timber produced from well-managed stands that have good tree density*

[Dashes indicate trees do not grow on soil type or that the soil type is not suited to the species indicated]

Name	North- and east-facing sites [1]—		South- and west-facing sites [2]—	
	Hardwoods	Pines	Hardwoods	Pines
	Bd. ft.	*Bd. ft.*	*Bd. ft.*	*Bd. ft.*
Alluvial land	150	------	------	------
Arenzville silt loam	275	------	------	------
Atterberry silt loam	150	------	100	------
Bertrand silt loam	250	------	------	------
Chaseburg silt loam	275	------	------	------
Chelsea fine sand	------	150	------	[3]
Curran silt loam	150	------	------	------
Dakota fine sandy loam [4]	100	275	------	------
Dodgeville silt loam	------	------	------	------
Dodgeville silt loam, deep	------	------	------	------
Downs silt loam	150	------	125	------
Dubuque silt loam	150	------	100	------
Dubuque silt loam, deep	200	------	125	------
Dubuque stony silt loam	150	------	100	------
Fayette silt loam, uplands	225	------	150	------
Fayette silt loam, valleys	275	------	175	------
Gale silt loam	175	300	100	200
Garwin silty clay loam	------	------	------	------
Hesch loam	150	200	100	200
Hesch fine sandy loam	125	200	75	200
Hixton loam	150	300	75	200
Hixton fine sandy loam	150	275	75	200
Jackson silt loam	200	------	------	------
Judson silt loam	275	------	------	------
Lamont fine sandy loam	150	250	75	150
Lindstrom silt loam	------	------	------	------
Marsh	------	------	------	------
Medary silt loam	200	------	------	------
Meridian loam	175	300	------	------
Meridian fine sandy loam	150	275	------	------
Muscatine silt loam	------	------	------	------
Orion silt loam	200	------	------	------
Richwood silt loam	------	------	------	------
Rozetta silt loam	200	------	125	------
Seaton silt loam	225	------	150	------
Sogn silt loam	[5]	------	------	------
Sogn loam	[5]	[5]	------	------
Sparta loamy fine sand	------	[5]	------	------
Sparta fine sand	------	[5]	------	------
Stony colluvial land	250	------	------	------
Stony rock land	150	------	75	------
Stronghurst silt loam	175	------	100	------
Tama silt loam	------	------	------	------
Terrace escarpments, medium textured	175	300	75	[3]
Terrace escarpments, coarse textured	------	200	------	[3]
Toddville silt loam	------	------	------	------

[1] In narrow valleys and in areas where the trees are partly protected from heat and from drying winds.

[2] Exposed ridgetops and slopes where the soils are exposed to high temperatures and drying winds.

[3] On south- and west-facing slopes, pines on Chelsea fine sand yield 0.3 cord; on Terrace escarpments, medium textured, pines yield 0.5 cord; and on Terrace escarpments, coarse textured, pines yield 0.3 cord.

[4] In areas where the water table is within 10 feet of the surface, yields of timber are higher.

[5] On north- and east-facing slopes, hardwoods on Sogn silt loam and hardwoods on Sogn loam yield 0.2 cord; pines on Sparta loamy fine sand and on Sparta fine sand yield 0.5 cord and 0.4 cord, respectively.

miscellaneous land types of Grant County. The figures given are for well-managed stands of hardwoods and pines that have good tree density. The figures given for board feet and for number of cords are for salable timber produced and not for total production per acre. These estimates were made by representatives of the Soil Conservation Service, the Wisconsin Conservation Department, and Forest Service after review of available research data and yield information concerning woodland production in Wisconsin. Most of the source and yield data are available in a mimeographed paper, Estimated Long-Time Average Yields of Corn, Oats, Hay, Pasture and Timber to be Expected From Important Mineral Soils in Wisconsin Under Average and High Levels of Management.

Engineering Properties of the Soils [5]

This section contains information that will help engineers to select sites for buildings for residential, industrial, and other purposes; to choose locations for highways; to determine the trafficability of soils; and to locate sand, gravel, and rock for use in construction. It will also help in planning dams, ponds, and other structures to control floods and conserve soil and water.

The soil map and accompanying report are too generalized for some engineering purposes, but they provide information valuable in planning detailed engineering field surveys and tests to determine the in-place condition of soils at proposed sites for construction. After testing the soil materials and observing their behavior in place and under varying conditions, the engineer can anticipate, to some extent, the properties of individual soils wherever they are mapped.

Some of the terms used by the soil scientist may not be familiar to the engineer; other terms, though familiar, have special meanings in soil science. The terms used in the three tables, and other special terms used in the report, are defined in the glossary.

Soil test data

Engineers who work with foundations and embankments need to know about the soils. Information about soils that cover a large area is especially valuable in the construction of highways. This is obtained partly by observing soils in the field and by studying the interpretations made by soil scientists.

Table 5 describes properties of the soils that are significant to engineering. The information about many of the soils is estimated, because samples were taken from only eight soil series in the county (see table 7). The estimates were made by comparing the soil with one that had been tested.

Table 6 describes the erodibility hazard of each soil; the suitability of each as a source of topping material, of sand, or of fill material for earthen embankments; and the suitability of each as a pond site, for drainage, for irrigation, and for terraces or diversions.

Table 7 gives moisture density data, results of mechanical analysis, liquid limit, and plasticity index for some

[5] A. W. KOWITZ, State conservation engineer, Soil Conservation Service, assisted in the preparation of this section.

of the principal soils. Some of the soil samples described in table 7 were collected by the Soil Conservation Service and tested by the Bureau of Public Roads. The rest were collected and tested by the Soil Conservation Service. For the samples tested by the Bureau of Public Roads, the engineering soil classifications given in this table are based on data obtained by mechanical analysis and by tests to determine the liquid limits and plasticity index. The mechanical analyses of the Bureau of Public Roads were determined by combined sieve and hydrometer methods. Percentages of clay obtained by the hydrometer method should not be used in naming the textural classes of soils.

The tests to show liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a soil material increases from a dry state, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Tests to show liquid limit and plastic limit were not run in the samples obtained by the Soil Conservation Service. For the SCS samples, the data shown in table 7 under the columns for liquid limit and plasticity index are estimates based on comparisons with other soils. The American Association of State Highway Officials (AASHO) and Unified Classification ratings for these samples are also estimates based on comparisons with similar soils.

Problems in engineering

Soils that erode easily or that are poorly drained present special engineering problems. For example, the soils that have clean sand in their profile and a deep water table are easily eroded by wind when they are exposed in roadways.

In soils that are poorly drained, seepage along the backslope of cuts may cause slumping or sliding of the overlying material. A perched water table beneath a pavement may result in freezing and thawing in the saturated foundation material. This, in turn, causes differential volume change and differences in bearing capacity. Consequently, before beginning the construction of a road, it is important to know the location of poorly drained areas. The poorly drained areas should be inspected in greater detail than other areas to determine the need for interceptor drains and underdrains. Figure 13 shows a paved highway laid over a somewhat poorly drained soil.

Only a few, small areas of poorly drained soils occur in the uplands. Extensive areas of poorly drained soils occur on the benches and bottoms along streams throughout the county. Adequate drainage must be provided for roads through poorly drained areas.

Some of the lower parts of the bottom lands are flooded each year. In these areas embankments may be needed to protect the structures. By constructing drainage ditches before the earthwork is begun, some of the sandy soils that have a high water table may be made more suitable as a source of borrow material as well as for excavation for roads.

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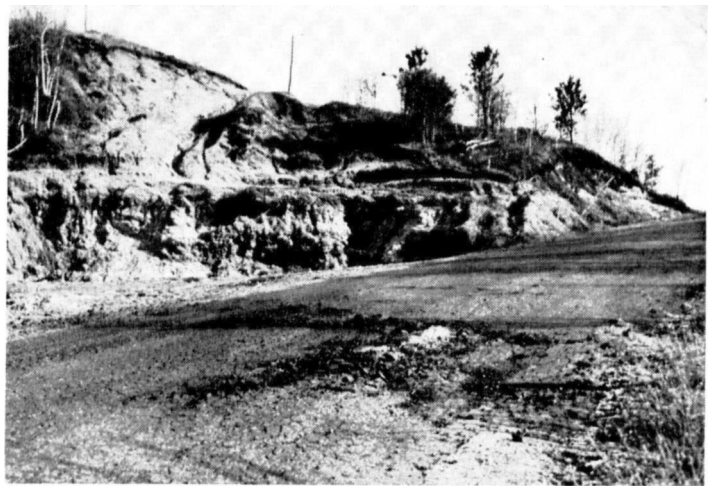

Figure 13.—**Paved highway laid over a somewhat poorly drained soil; because of seepage the soil gave poor support to the highway. As a result, breaks occurred in the highway. (Photo by F. D. Hole, Soil Survey Division, University of Wisconsin.)**

Formation and Classification of Soils

In this section are discussed the factors that affect soil formation, the morphology and composition of the soils of Grant County, and the classification of the soils in higher categories.

Factors of Soil Formation

Soil is formed by weathering and other processes that act on parent material. The characteristics of the soil at any given point depend upon (1) the climate, (2) the plant and animal life, (3) the physical and mineralogical composition of the parent material, (4) the relief or lay of the land, and (5) time. Climate and its effect on soil and plants is modified by the characteristics of the soil and by relief. Relief, in turn, strongly influences drainage, aeration, runoff, erosion, and exposure of the surface of the soil to sun and wind.

The soil series of Grant County are arranged by position in table 8, and their parent material, original vegetation, and natural drainage are given.

Climate

The climate of Grant County, like that of most of southern Wisconsin, is marked by wide extremes of temperature. The climate is fairly uniform throughout the county, however, and has caused no discernible differences among the soils. Average temperatures in the valley near the Mississippi River are about 2 degrees warmer than in the uplands.

Precipitation is distributed evenly throughout the county. The annual rainfall averages nearly 32 inches a year, and much of it falls during the growing season. Snowfall averages nearly 40 inches.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
An	Alluvial land.	Moderately well drained to poorly drained, mixed sandy and silty soil materials 40 or more inches thick, on nearly level stream flood plains.	Very deep
Ar	Arenzville silt loam.	Well drained to moderately well drained, deep, silty alluvium on nearly level stream flood plains; the surface soil is friable, granular silt; the underlying material is friable, massive silt with some thin lenses of sand.	Very deep
AtA	Atterberry silt loam, 0 to 2 percent slopes.	Somewhat poorly drained, silty soils formed on uplands; the surface soil is friable silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is massive, heavy silt loam, underlain by shale bedrock.	5 or more feet
AtB	Atterberry silt loam, 2 to 6 percent slopes.		
AwC2	Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded.		
BtA	Bertrand silt loam, 0 to 2 percent slopes.	Well-drained, silty soils formed on stream terraces; the surface layer is friable, granular silt loam, and the subsoil is firm, blocky silty clay loam underlain by friable, stratified silt and sand at depths below 42 inches.	Very deep
BtB	Bertrand silt loam, 2 to 6 percent slopes.		
BtB2	Bertrand silt loam, 2 to 6 percent slopes, moderately eroded.		
BtC	Bertrand silt loam, 6 to 10 percent slopes.		
BtC2	Bertrand silt loam, 6 to 10 percent slopes, moderately eroded.		
BtD2	Bertrand silt loam, 10 to 15 percent slopes, moderately eroded.		
ChA	Chaseburg silt loam, 0 to 3 percent slopes.	Well drained to moderately well drained, silty alluvial soils in narrow valleys and on fans; the surface soil is friable, granular silt loam, the subsoil is friable, blocky silt loam, and the substratum is friable, massive silt loam; in places there are strata of fine sand in the profile; in most places stones occur on the surface.	4 feet or more
ChB	Chaseburg silt loam, 3 to 6 percent slopes.		
ChC	Chaseburg silt loam, 6 to 15 percent slopes.		
CsB2	Chelsea fine sand, 0 to 6 percent slopes, eroded.	Excessively drained, deep, sandy soils formed on valley slopes; the surface soil is granular fine sand and is underlain by single grain, loose, stratified fine sand.	10 or more feet
CsC2	Chelsea fine sand, 6 to 10 percent slopes, eroded.		
CsD2	Chelsea fine sand, 10 to 15 percent slopes, eroded.		
Cu	Curran silt loam.	Somewhat poorly drained, silty soil formed on nearly level stream terraces; the surface soil is friable, granular silt loam; the subsoil is firm, blocky silty clay loam, and the substratum is firm, massive silt; in places, at depths below 40 inches, there is stratified sand and silt.	Very deep
DaA	Dakota fine sandy loam, 0 to 2 percent slopes.	Well-drained soils formed on nearly level to gently sloping stream terraces in medium-textured outwash 24 to 40 inches thick over sand; the surface soil is friable, granular loam, and the subsoil is friable, blocky loam underlain by single grain, loose, stratified sand that contains some gravel.	Very deep
DaB	Dakota fine sandy loam, 2 to 6 percent slopes.		
DaC2	Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded.		
DbC2	Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded.	Well-drained, silty soils formed on upland ridges over reddish clay that rests on limestone bedrock; the surface soil is friable, crumbly silt loam, the subsoil is firm, blocky silty clay loam to silty clay, and the substratum is angular blocky clay; there are fragments of chert in the subsoil and substratum.	2 to 4 feet
DbD2	Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded.		
DbE2	Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded.		
DbF2	Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded.		
DcB2	Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded.	Well-drained, deep silty soils formed on upland ridges over reddish clay that rests on limestone bedrock; the surface soil is friable, crumbly silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is angular blocky clay; fragments of chert occur in the lower subsoil and in the substratum.	3 to 6 feet
DcC	Dodgeville silt loam, deep, 6 to 10 percent slopes.		
DcC2	Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded.		
DcD2	Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded.		
DcE	Dodgeville silt loam, deep, 15 to 20 percent slopes.		

See footnotes at end of table.

and estimates of properties significant to engineering

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
[5]	Moderate	Intermediate	1 to 5 (stable)	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to very slightly acid or very mildly alkaline.
[5]	Moderate	Intermediate	5 to 10 (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
Maquoketa shale	Moderately slow.	Intermediate	4 to 6	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Medium acid to neutral.
[5]	Moderate	Intermediate	10 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
Cambrian sandstone.	Moderate	Intermediate	5 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
[5]	Very rapid	High	Very deep	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium acid.
[5]	Moderately slow.	Intermediate	3 to 6 (stable).	Slightly sticky and slightly plastic.	Slightly sticky and slightly plastic.	Slightly acid to strongly acid.
[5]	Moderate to moderately rapid.	Intermediate	5 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Strongly acid to neutral.
Galena and Lower Magnesian dolomite.	Moderately slow.	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Slightly acid to medium acid.
Galena and Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Slightly acid to medium acid.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
DdC3	Dodgeville soils, 6 to 10 percent slopes, severely eroded.	Well-drained, thin soils formed on upland ridges in reddish clay over limestone bedrock; the surface soil is firm, granular silty clay loam, the subsoil is firm, angular blocky silty clay that rests on a clay substratum.	1 to 3 feet
DdD3	Dodgeville soils, 10 to 15 percent slopes, severely eroded.		
DeB3	Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded.	Well-drained, deep silty soils formed on upland ridges over reddish clay that rests on limestone bedrock; the surface soil is friable, crumbly silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is angular blocky clay; fragments of chert occur in the lower subsoil and in the substratum.	3 to 6 feet
DeC3	Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded.		
DeD3	Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded.		
DoB2	Downs silt loam, 2 to 6 percent slopes, moderately eroded.	Well-drained, deep, silty soils formed on sloping upland ridges; the surface soil is friable, granular silt loam; the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive silt loam.	4 feet or more
DoB3	Downs silt loam, 2 to 6 percent slopes, severely eroded.		
DoC	Downs silt loam, 6 to 10 percent slopes.		
DoC2	Downs silt loam, 6 to 10 percent slopes, moderately eroded.		
DoD2	Downs silt loam, 10 to 15 percent slopes, moderately eroded.		
DoD3	Downs silt loam, 10 to 15 percent slopes, severely eroded.		
DsB	Dubuque silt loam, 2 to 6 percent slopes.	Well-drained soils formed on upland ridges in a thin layer of silt over reddish clay that is underlain by limestone bedrock; the surface soil is friable, granular silt loam, the subsoil is firm, angular blocky silty clay loam, and the substratum is angular blocky clay; in many places there are angular fragments of chert in the substratum.	2 to 5 feet
DsB2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded.		
DsC	Dubuque silt loam, 6 to 10 percent slopes.		
DsC2	Dubuque silt loam, 6 to 10 percent slopes, moderately eroded.		
DsD	Dubuque silt loam, 10 to 15 percent slopes.		
DsD2	Dubuque silt loam, 10 to 15 percent slopes, moderately eroded.		
DsE	Dubuque silt loam, 15 to 20 percent slopes.		
DsE2	Dubuque silt loam, 15 to 20 percent slopes, moderately eroded.		
DsF	Dubuque silt loam, 20 to 30 percent slopes.		
DsF2	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded.		
DsG	Dubuque silt loam, 30 to 45 percent slopes.		
DtB	Dubuque silt loam, deep, 2 to 6 percent slopes.	Well-drained soils formed on upland ridges in a moderately deep blanket of silt over reddish clay that is underlain by limestone bedrock; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is angular blocky, gritty clay that contains many fragments of chert.	3 to 6 feet
DtB2	Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded.		
DtC	Dubuque silt loam, deep, 6 to 10 percent slopes.		
DtC2	Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded.		
DtD	Dubuque silt loam, deep, 10 to 15 percent slopes.		
DtD2	Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded.		
DtE	Dubuque silt loam, deep, 15 to 20 percent slopes.		
DtE2	Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded.		
DtF	Dubuque silt loam, deep, 20 to 30 percent slopes.		
DtF2	Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded.		
DtG	Dubuque silt loam, deep, 30 to 45 percent slopes.		
DtG2	Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded.		
DuC3	Dubuque soils, 6 to 10 percent slopes, severely eroded.	Well-drained, thin soils formed on upland ridges in reddish clay over limestone bedrock; the surface soil is firm, granular silty clay loam; the subsoil is angular blocky silty clay, and the substratum is angular blocky clay that contains many fragments of chert.	1 to 3 feet
DuD3	Dubuque soils, 10 to 15 percent slopes, severely eroded.		
DuE3	Dubuque soils, 15 to 20 percent slopes, severely eroded.		
DuF3	Dubuque soils, 20 to 30 percent slopes, severely eroded.		

See footnotes at end of table.

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
Galena and Lower Magnesian dolomite.	Moderately slow.	Intermediate--	50 or more (stable).	Sticky and plastic.	Very sticky and very plastic.	Slightly acid to medium acid.
Galena and Lower Magnesian dolomite.	Moderate-----	Intermediate--	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Slightly acid to medium acid.
Galena and Lower Magnesian dolomite.	Moderate-----	Intermediate--	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to strongly acid.
Galena and Lower Magnesian dolomite.	Moderate-----	Intermediate--	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Medium acid to strongly acid.
Galena and Lower Magnesian dolomite.	Moderate-----	Intermediate--	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Medium acid to strongly acid.
Galena and Lower Magnesian dolomite.	Moderate-----	Intermediate---	50 or more (stable).	Sticky and plastic.	Very sticky and very plastic.	Medium acid to strongly acid.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
DvB3	Dubuque soils, deep, 2 to 6 percent slopes, severely eroded.	Well-drained soils formed on upland ridges in a moderately deep blanket of silt over reddish clay that is underlain by limestone bedrock; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is angular blocky clay that contains many fragments of chert.	3 to 6 feet
DvC3	Dubuque soils, deep, 6 to 10 percent slopes, severely eroded.		
DvD3	Dubuque soils, deep, 10 to 15 percent slopes, severely eroded.		
DvE3	Dubuque soils, deep, 15 to 20 percent slopes, severely eroded.		
DvF3	Dubuque soils, deep, 20 to 30 percent slopes, severely eroded.		
DyD	Dubuque stony silt loam, 10 to 15 percent slopes.	Well-drained, stony soils formed on upland ridges in a thin mantle of silt over reddish clay that is underlain by limestone bedrock; the surface soil is friable, granular stony silt loam, the subsoil is angular blocky, gritty silty clay loam, and the substratum is clay.	2 to 4 feet
DyD2	Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded.		
DyE2	Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded.		
DyF	Dubuque stony silt loam, 20 to 30 percent slopes.		
DyF2	Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded.		
DyG	Dubuque stony silt loam, 30 to 45 percent slopes.		
FaB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded.	Well-drained, deep, silty soils formed on upland ridges; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive silt loam.	4 or more feet
FaB3	Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded.		
FaC	Fayette silt loam, uplands, 6 to 10 percent slopes.		
FaC2	Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded.		
FaC3	Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded.		
FaD	Fayette silt loam, uplands, 10 to 15 percent slopes.		
FaD2	Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded.		
FaD3	Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded.		
FaE	Fayette silt loam, uplands, 15 to 20 percent slopes.		
FaE2	Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded.		
FaE3	Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded.		
FaF	Fayette silt loam, uplands, 20 to 30 percent slopes.		
FaF2	Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded.		
FaF3	Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded.		
FvC	Fayette silt loam, valleys, 6 to 10 percent slopes.	Well-drained, deep, silty soils formed on valley slopes of uplands; the surface soil is friable, granular silt loam, the subsoil is firm, blocky, light silty clay loam, and the substratum is friable, massive, and silty; in places there are many large limestone boulders and some rock outcrops; fine sandy loam occurs in a thin cover in places or in thin strata in the solum.	4 or more feet
FvC2	Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded.		
FvD	Fayette silt loam, valleys, 10 to 15 percent slopes.		
FvD2	Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded.		
FvE	Fayette silt loam, valleys, 15 to 20 percent slopes.		
FvE2	Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded.		
FvE3	Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded.		
FvF	Fayette silt loam, valleys, 20 to 30 percent slopes.		
FvF2	Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded.		
FvF3	Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded.		

See footnotes at end of table.

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
Galena and Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Very sticky and very plastic.	Medium acid to strongly acid.
Galena and Lower Magnesian dolomite.	Moderate	Intermediate	Over 50 feet (stable).	Sticky and plastic.	Very sticky and very plastic.	Medium acid to strongly acid.
Galena and Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Cambrian sandstone.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
GaC	Gale silt loam, 2 to 10 percent slopes.	Well-drained, moderately deep, silty soils formed over sandstone on valley slopes of uplands; the surface soil is friable, granular silt loam underlain by firm, blocky silty clay loam that grades to single grain, loose fine sand substratum that rests on sandstone bedrock; in places there are boulders and outcrops of sandstone and limestone.	2 to 4 feet
GaC2	Gale silt loam, 2 to 10 percent slopes, moderately eroded.		
GaC3	Gale silt loam, 2 to 10 percent slopes, severely eroded.		
GaD2	Gale silt loam, 10 to 15 percent slopes, moderately eroded.		
GaD3	Gale silt loam, 10 to 15 percent slopes, severely eroded.		
GaE2	Gale silt loam, 15 to 20 percent slopes, moderately eroded.		
GaE3	Gale silt loam, 15 to 20 percent slopes, severely eroded.		
GaF	Gale silt loam, 20 to 30 percent slopes.		
GaF2	Gale silt loam, 20 to 30 percent slopes, moderately eroded.		
Gw	Garwin silty clay loam.	Poorly drained, deep, silty clay loam soil formed on nearly level upland ridges; the surface soil is friable, granular silty clay loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, heavy silt loam.	4 or more feet
HcC2	Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded.	Somewhat excessively drained, sandy soils on upland valley slopes that are 2 to 3 feet thick over sandstone; the surface soil is very friable, granular fine sandy loam, the subsoil is blocky fine sandy loam underlain by single grain, loose sand that grades to bedrock with increasing depth.	2½ to 4 feet
HcD2	Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded.		
HcD3	Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded.		
HcE	Hesch fine sandy loam, 15 to 20 percent slopes.		
HcE2	Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded.		
HcE3	Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded.		
HcF	Hesch fine sandy loam, 20 to 45 percent slopes.		
HcF2	Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded.		
HeC2	Hesch loam, 2 to 10 percent slopes, moderately eroded.	Well-drained soils formed on upland valley slopes in medium-textured materials that are 2 to 3 feet thick over sandstone; the surface soil is friable, granular loam, the subsoil is friable, blocky fine sandy loam to sandy clay loam, and overlies single grain, loose, fine sand at depths between 2 and 3 feet.	2½ to 4 feet
HeD2	Hesch loam, 10 to 15 percent slopes, moderately eroded.		
HeE2	Hesch loam, 15 to 20 percent slopes, moderately eroded.		
HfB2	Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded.	Somewhat excessively drained, sandy soils on upland valley slopes that are 2 to 3 feet thick and have formed over sandstone; the surface soil is very friable, granular fine sandy loam, the subsoil is firm, blocky loam, and the substratum is single grain, loose, fine sand.	2½ to 4 feet
HfC2	Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded.		
HfD	Hixton fine sandy loam, 10 to 15 percent slopes.		
HfD2	Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded.		
HfD3	Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded.		
HfE	Hixton fine sandy loam, 15 to 20 percent slopes.		
HfE2	Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded.		
HfE3	Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded.		
HfF	Hixton fine sandy loam, 20 to 30 percent slopes.		
HfF2	Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded.		
HfF3	Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded.		
HfG	Hixton fine sandy loam, 30 to 45 percent slopes.		
HfG2	Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded.		
HxC	Hixton loam, 2 to 10 percent slopes.	Well-drained sandy soils that are 2 to 3 feet thick, and have formed on upland valley slopes, over sandstone; the surface soil is friable, granular loam, the subsoil is friable, blocky sandy clay loam to loam, and the substratum is single grain, loose, fine sand that grades to sandstone.	2½ to 4 feet
HxC2	Hixton loam, 2 to 10 percent slopes, moderately eroded.		
HxD2	Hixton loam, 10 to 15 percent slopes, moderately eroded.		
HxD3	Hixton loam, 10 to 15 percent slopes, severely eroded.		
HxE2	Hixton loam, 15 to 20 percent slopes, moderately eroded.		
HxE3	Hixton loam, 15 to 20 percent slopes, severely eroded.		
HxF	Hixton loam, 20 to 30 percent slopes.		
HxF2	Hixton loam, 20 to 30 percent slopes, moderately eroded.		

See footnotes at end of table.

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
Cambrian sandstone.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid.
Lower Magnesian dolomite.	Moderately slow.	Intermediate	3 to 6 (stable)	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Neutral to mildly alkaline.
Cambrian sandstone.	Moderately rapid.	High	50 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid.
Cambrian sandstone.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
Cambrian sandstone.	Moderately rapid.	High	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
Cambrian sandstone.	Moderate	Intermediate	Very deep	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
JaA	Jackson silt loam, 0 to 2 percent slopes.	Moderately well drained, deep, silty soils formed on nearly level to sloping stream terraces; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, and silty; in places there is stratified fine sand and silt at depths below 42 inches.	Very deep
JaB	Jackson silt loam, 2 to 6 percent slopes.		
JaB2	Jackson silt loam, 2 to 6 percent slopes, moderately eroded.		
JaC2	Jackson silt loam, 6 to 10 percent slopes, moderately eroded.		
JuA	Judson silt loam, 0 to 3 percent slopes.	Well-drained, silty, alluvial soils in narrow valleys and on fans; the surface soil is friable, granular silt loam, the subsoil is friable, blocky, heavy silt loam, and the substratum is friable, massive, and silty; in places there are thin layers of fine sand in the profile.	4 or more feet
JuB	Judson silt loam, 3 to 10 percent slopes.		
LaB2	Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded.	Somewhat excessively drained, loamy soils formed on sloping to steep upland ridges; the surface soil is friable, blocky fine sandy loam, and the subsoil is friable, blocky fine sandy loam underlain by single grain, loose, loamy fine sand.	4 or more feet
LaD2	Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded.		
LaD3	Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded.		
LaE	Lamont fine sandy loam, 15 to 20 percent slopes.		
LaE2	Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded.		
LaF	Lamont fine sandy loam, 20 to 45 percent slopes.		
LaF2	Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded.		
LnC2	Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded.	Well-drained, deep, silty soils formed on valley slopes of uplands; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, and silty; in places there are thin layers of fine sand in the profile.	4 or more feet
LnE2	Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded.		
Ma	Marsh.	Poorly drained mixed organic and alluvial deposits along stream bottoms; flooded most of the year.	Very deep
MdA	Medary silt loam, 0 to 2 percent slopes.	Moderately well drained soils formed on high stream terraces; the surface soil is friable, granular silt loam, the subsoil is firm, angular blocky silty clay, and the substratum is firm, massive silty clay.	Very deep
MdB2	Medary silt loam, 2 to 6 percent slopes, moderately eroded.		
MdC2	Medary silt loam, 6 to 10 percent slopes, moderately eroded.		
MdD2	Medary silt loam, 10 to 15 percent slopes, moderately eroded.		
MeC3	Medary soils, 6 to 10 percent slopes, severely eroded.		
MfA	Meridian fine sandy loam, 0 to 2 percent slopes.	Well-drained, sandy soils that are 2 to 3 feet thick and overlie sand on stream terraces; the surface soil is very friable, granular fine sandy loam, the subsoil is friable, blocky loam, and the substratum is single grain, loose, fine sand; in places there are thin, finer textured layers in the substratum.	Very deep
MfB	Meridian fine sandy loam, 2 to 6 percent slopes.		
MfB2	Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded.		
MfC2	Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded.		
MfC3	Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded.		
MfD2	Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded.		
MmA	Meridian loam, 0 to 2 percent slopes.	Well-drained, loamy soils that are 2 to 3 feet thick and overlie loose sand on stream terraces; the surface soil is friable, granular loam, the subsoil is firm, blocky sandy clay loam, and the substratum is single grain, loose, fine sand.	Very deep
MmB	Meridian loam, 2 to 6 percent slopes.		
MmB2	Meridian loam, 2 to 6 percent slopes, moderately eroded.		
MmC2	Meridian loam, 6 to 10 percent slopes, moderately eroded.		
MmD2	Meridian loam, 10 to 15 percent slopes, moderately eroded.		
MuA	Muscatine silt loam, 0 to 2 percent slopes.	Somewhat poorly drained, deep, silty soils on nearly level to gently sloping upland ridges; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is massive and silty; there are many areas that are moderately well drained.	4 or more feet
MuB	Muscatine silt loam, 2 to 6 percent slopes.		
MuB2	Muscatine silt loam, 2 to 6 percent slopes, moderately eroded.		

See footnotes at end of table.

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
(5)	Moderate	Intermediate	5 to 10 (variable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Cambrian sandstone.	Moderate	Intermediate	5 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to neutral.
(5)	Moderate to rapid.	Intermediate	Very deep	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
Cambrian sandstone.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid.
(5)	(5)	(5)	Less than 1 (stable).	(5)	(5)	(5).
(5)	Slow	Low	5 or more	Sticky and plastic	Very sticky and very plastic.	Medium acid to neutral.
(5)	Moderate to moderately rapid.	Intermediate	10 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Moderate to moderately rapid.	Intermediate	10 or more	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (variable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to neutral.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
Or	Orion silt loam.	Somewhat poorly drained, deep, silty alluvium on the nearly level flood plains of streams; the surface soil is friable, granular silt loam, the subsoil is friable, blocky silt and is underlain by firm, massive, light silty clay loam.	Very deep
RcA	Richwood silt loam, 0 to 2 percent slopes.	Well-drained, deep, silty soils formed on stream terraces; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and there is stratified silt and fine sand at depths below 42 inches.	Very deep
RcB	Richwood silt loam, 2 to 6 percent slopes.		
RoC	Rozetta silt loam, 6 to 10 percent slopes.	Moderately well drained, deep, silty soils formed on sloping upland ridges; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, and silty.	4 or more feet
RoC2	Rozetta silt loam, 6 to 10 percent slopes, moderately eroded.		
SeB	Seaton silt loam, 2 to 6 percent slopes.	Well-drained, deep, silty soils formed on upland ridges; the surface soil is friable, granular silt loam, the subsoil is friable, blocky silt loam, and the substratum is massive, coarse silt and very fine sandy loam.	4 or more feet
SeB2	Seaton silt loam, 2 to 6 percent slopes, moderately eroded.		
SeC2	Seaton silt loam, 6 to 10 percent slopes, moderately eroded.		
SeC3	Seaton silt loam, 6 to 10 percent slopes, severely eroded.		
SeD	Seaton silt loam, 10 to 15 percent slopes.		
SeD2	Seaton silt loam, 10 to 15 percent slopes, moderately eroded.		
SeD3	Seaton silt loam, 10 to 15 percent slopes, severely eroded.		
SeE	Seaton silt loam, 15 to 20 percent slopes.		
SeE2	Seaton silt loam, 15 to 20 percent slopes, moderately eroded.		
SeE3	Seaton silt loam, 15 to 20 percent slopes, severely eroded.		
SeF	Seaton silt loam, 20 to 45 percent slopes.		
SeF2	Seaton silt loam, 20 to 45 percent slopes, moderately eroded.		
SnD	Sogn loam, 10 to 15 percent slopes.	Somewhat excessively drained, thin soils formed on upland ridges over limestone bedrock; the surface soil is friable, granular loam and overlies limestone bedrock at depths of less than 1 foot.	Less than 1 foot
SnD2	Sogn loam, 10 to 15 percent slopes, moderately eroded.		
SnE2	Sogn loam, 15 to 20 percent slopes, moderately eroded.		
SoB2	Sogn silt loam, 2 to 10 percent slopes, moderately eroded.	Somewhat excessively drained, thin soils formed on upland ridges over limestone bedrock.	Less than 1 foot
SoD	Sogn silt loam, 10 to 15 percent slopes.		
SoD2	Sogn silt loam, 10 to 15 percent slopes, moderately eroded.		
SoE	Sogn silt loam, 15 to 20 percent slopes.		
SoE2	Sogn silt loam, 15 to 20 percent slopes, moderately eroded.		
SpC	Sparta fine sand and Blown-out land, 6 to 15 percent slopes.	Excessively drained, deep, sandy soils formed on nearly level to sloping stream terraces; the surface soil is very friable fine sand and overlies single grain, loose, stratified sand.	Very deep
SrC	Sparta fine sand and Dune land, 6 to 15 percent slopes.		
SsA	Sparta loamy fine sand, 0 to 2 percent slopes.	Excessively drained, deep, sandy soils formed on nearly level stream terraces; the surface soil is very friable loamy fine sand that grades to single grain, loose, stratified sand with increasing depth.	Very deep
SsA2	Sparta loamy fine sand, 0 to 2 percent slopes, eroded.		
SsB	Sparta loamy fine sand, 2 to 6 percent slopes.		
SsB2	Sparta loamy fine sand, 2 to 6 percent slopes, eroded.		
SsC	Sparta loamy fine sand, 6 to 15 percent slopes.		
StA	Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes.		
Su	Stony colluvial land.	Well-drained, stony colluvium deposited on nearly level fans.	4 or more feet

See footnotes at end of table.

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3] *Feet*	Wet consistence		Reaction [4]
				Subsoil	Substratum	
(5)	Moderate	Intermediate	3 to 5 (stable)	Nonsticky and nonplastic.	Slightly sticky and slightly plastic.	Neutral.
(5)	Moderate	Intermediate	10 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid.
Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
(5)	Moderate	Intermediate	Very deep	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to strongly acid.
Lower Magnesian dolomite.	(5)	Intermediate	Very deep	(5)	(5)	Neutral.
Lower Magnesian dolomite.	(5)	Intermediate	Very deep	(5)	(5)	Neutral.
(5)	Rapid to very rapid.	High	5 or more	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
(5)	Rapid to very rapid.	High	5 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to medium acid.
Cambrian sandstone.	Moderate	Intermediate	5 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Medium acid to neutral.

TABLE 5.—*Brief descriptions of the soils of Grant County*

Map symbol	Soil	Soil description	Depth to bedrock
Sv	Stony rock land, steep.	Somewhat excessively drained, medium-textured, mixed soil materials on steep valley slopes; many rock outcrops and scattered boulders.	1 to 5 feet
Sw	Stony rock land, very steep.		
SyB	Stronghurst silt loam, 2 to 6 percent slopes.	Somewhat poorly drained, deep, silty soils formed on upland ridges; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable,massive, and silty.	4 or more feet
SyB2	Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded.		
TaA	Tama silt loam, 0 to 2 percent slopes.	Well-drained, deep, silty soils formed on upland ridges; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, and silty.	4 or more feet
TaB	Tama silt loam, 2 to 6 percent slopes.		
TaB2	Tama silt loam, 2 to 6 percent slopes, moderately eroded.		
TaB3	Tama silt loam, 2 to 6 percent slopes, severely eroded.		
TaC2	Tama silt loam, 6 to 10 percent slopes, moderately eroded.		
TaC3	Tama silt loam, 6 to 10 percent slopes, severely eroded.		
TaD	Tama silt loam, 10 to 15 percent slopes.		
TaD2	Tama silt loam, 10 to 15 percent slopes, moderately eroded.		
TaD3	Tama silt loam, 10 to 15 percent slopes, severely eroded.		
Tc	Terrace escarpments, medium textured.	Well-drained to somewhat excessively drained loamy soils on strongly sloping to steep stream terraces.	Very deep
Te	Terrace escarpments, coarse textured.	Excessively drained, sandy soils on terraces; slopes range from 12 to more than 30 percent.	Very deep
To	Toddville silt loam.	Moderately well drained, deep, silty soil formed on nearly level stream terraces; the surface soil is friable, granular silt loam, the subsoil is firm, blocky silty clay loam, and the substratum is friable, massive, and silty; in places, stratified fine sand and silt occurs at depths below 42 inches.	Very deep

[1] The relative classes of soil permeability given refer to estimated rates of movement of water in inches per hour through saturated undisturbed cores under a ½-inch head of water:

Very slow	Less than 0.05.
Slow	0.05 to 0.20.
Moderately slow	0.20 to 0.80.
Moderate	0.80 to 2.50.
Moderately rapid	2.50 to 5.00.
Rapid	2.00 to 10.00.
Very rapid	More than 10.00.

[2] The infiltration rates (engineering application) describe the flow or movement of water through the soil surface into a nonsaturated soil. The terms used to describe the range of values of the infiltration capacity through the profile of bare soils after 1 hour of continuous rainfall are described as follows:

High	0.50+ inches per hour.
Intermediate	0.10 to 0.50+ inches per hour.
Low	Less than 0.10 inch per hour.

(The above definition is according to R. E. Horton, Am. Soc. Civil Engr. Handbook. 1949.)

and estimates of properties significant to engineering—Continued

Geologic formation	Permeability of subsoil [1]	Infiltration rate [2]	Depth to water table [3]	Wet consistence		Reaction [4]
				Subsoil	Substratum	
			Feet			
Cambrian sandstone.	Moderate	Intermediate	50 or more (stable).	[5]	[5]	Slightly acid to strongly acid.
Lower Magnesian dolomite.	Moderately slow.	Intermediate	3 to 5 (variable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Medium acid to strongly acid.
Lower Magnesian dolomite.	Moderate	Intermediate	50 or more (stable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Strongly acid to neutral.
[5]	Moderate	Intermediate	50 or more (stable).	[5]	Nonsticky and nonplastic.	Slightly acid to strongly acid.
[5]	Very rapid	High	50 or more (stable).	Nonsticky and nonplastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.
[5]	Moderate	Intermediate	5 to 10 (variable).	Slightly sticky and slightly plastic.	Nonsticky and nonplastic.	Slightly acid to strongly acid.

[3] Refers to both seasonal and relatively stable high water tables. In some soils the water table is fairly constant at a given depth throughout the year; in others, the depth to the water table varies according to seasonal precipitation.

[4] Reaction refers to soil acidity or alkalinity and is expressed in *pH*—the logarithm of the reciprocal of the H—ion concentration.

	pH
Strongly acid	5.1 to 5.5.
Medium acid	5.6 to 6.0.
Slightly acid	6.1 to 6.5.
Neutral	6.6 to 7.3.
Mildly alkaline	7.4 to 7.8.

[5] Not determined or is variable.

TABLE 6.—*Estimated soil*

Soil name [1] and mapping symbol	Erodibility hazard [2]			Suitability as source of—	
	Surface	Subsoil	Substratum	Topsoil [3]	Sand [4]
Alluvial land (An)	Moderate	(9)	Severe	Good	Not suitable
Arenzville silt loam (Ar)	Moderate	Moderate	Moderate	Good	Not suitable
Atterberry silt loam (AtA, AtB, AwC2)	Moderate	Slight	Moderate	Good	Not suitable
Bertrand silt loam (BtA, BtB, BtB2, BtC, BtC2, BtD2).	Moderate	Moderate	Moderate	Good	Questionable
Chaseburg silt loam (ChA, ChB, ChC)	Moderate	Moderate	Moderate	Good	Not suitable
Chelsea fine sand (CsB2, CsC2, CsD2)	Severe	Severe	Severe	Poor	Suitable
Curran silt loam (Cu)	Moderate	Slight	Moderate	Good	Not suitable
Dakota fine sandy loam (DaA, DaB, DaC2)	Moderate	Moderate	Severe	Good	Suitable
Dodgeville silt loam (DbC2, DbD2, DbE2, DbF2)	Moderate	Slight	Slight	Good	Not suitable
Dodgeville silt loam, deep (DcB2, DcC, DcC2, DcD2, DcE).	Moderate	Moderate	Slight	Good	Not suitable
Dodgeville soils (DdC3, DdD3)	Moderate	Slight	Slight	Fair	Not suitable
Dodgeville soils, deep (DeB3, DeC3, DeD3)	Moderate	Moderate	Slight	Good	Not suitable
Downs silt loam (DoB2, DoB3, DoC, DoC2, DoD2, DoD3).	Moderate	Moderate	Moderate	Good	Not suitable
Dubuque silt loam (DsB, DsB2, DsC, DsC2, DsD, DsD2, DsE, DsE2, DsF, DsF2, DsG).	Moderate	Slight	Slight	Good	Not suitable
Dubuque silt loam, deep (DtB, DtB2, DtC, DtC2, DtD, DtD2, DtE, DtE2, DtF, DtF2, DtG, DtG2).	Moderate	Moderate	Slight	Good	Not suitable
Dubuque soils (DuC3, DuD3, DuE3, DuF3)	Moderate	Slight	Slight	Fair	Not suitable
Dubuque soils, deep (DvB3, DvC3, DvD3, DvE3, DvF3).	Moderate	Moderate	Slight	Good	Not suitable
Dubuque stony silt loam (DyD, DyD2, DyE2, DyF, DyF2, DyG).	Moderate	Slight	Slight	Fair	Not suitable
Fayette silt loam, uplands (FaB2, FaB3, FaC, FaC2, FaC3, FaD, FaD2, FaD3, FaE, FaE2, FaE3, FaF, FaF2, FaF3).	Moderate	Moderate	Moderate	Good	Not suitable
Fayette silt loam, valleys (FvC, FvC2, FvD, FvD2, FvE, FvE2, FvE3, FvF, FvF2, FvF3).	Moderate	Moderate	Moderate	Good	Not suitable
Gale silt loam (GaC, GaC2, GaC3, GaD2, GaD3, GaE2, GaE3, GaF, GaF2).	Moderate	Moderate	Severe	Good	Questionable
Garwin silty clay loam (Gw)	Slight	Slight	Medium	Good	Not suitable
Hesch fine sandy loam (HcC2, HcD2, HcD3, HcE, HcE2, HcE3, HcF, HcF2).	Moderate	Moderate	Severe	Good	Questionable
Hesch loam (HeC2, HeD2, HeE2)	Moderate	Moderate	Severe	Good	Questionable
Hixton fine sandy loam (HfB2, HfC2, HfD, HfD2, HfD3, HfE, HfE2, HfE3, HfF, HfF2, HfF3, HfG, HfG2).	Severe	Moderate	Severe	Fair	Questionable
Hixton loam (HxC, HxC2, HxD2, HxD3, HxE2, HxE3, HxF, HxF2).	Moderate	Moderate	Severe	Good	Questionable
Jackson silt loam (JaA, JaB, JaB2, JaC2)	Moderate	Moderate	Moderate	Good	Not suitable
Judson silt loam (JuA, JuB)	Moderate	Moderate	Moderate	Good	Not suitable
Lamont fine sandy loam (LaB2, LaD2, LaD3, LaE, LaE2, LaF, LaF2).	Severe	Moderate	Severe	Fair	Not suitable
Lindstrom silt loam (LnC2, LnE2)	Moderate	Moderate	Moderate	Good	Not suitable
Marsh (Ma)	(9)	(9)	(9)	(9)	(9)
Medary silt loam (MdA, MdB2, MdC2, MdD2)	Moderate	Moderate	Moderate	Good	Not suitable
Medary soils (MeC3)	Moderate	Slight	Slight	Poor	Not suitable
Meridian fine sandy loam (MfA, MfB, MfB2, MfC2, MfC3, MfD2).	Severe	Moderate	Severe	Fair	Suitable
Meridian loam (MmA, MmB, MmB2, MmC2, MmD2).	Moderate	Moderate	Severe	Good	Suitable
Muscatine silt loam (MuA, MuB, MuB2)	Moderate	Moderate	Moderate	Good	Not suitable
Orion silt loam (Or)	Moderate	Moderate	Moderate	Good	Not suitable
Richwood silt loam (RcA, RcB)	Moderate	Moderate	Moderate	Good	Questionable
Rozetta silt loam (RoC, RoC2)	Moderate	Moderate	Moderate	Good	Not suitable
Seaton silt loam (SeB, SeB2, SeC2, SeC3, SeD, SeD2, SeD3, SeE, SeE2, SeE3, SeF, SeF2).	Severe	Moderate	Severe	Good	Not suitable
Sogn loam (SnD, SnD2, SnE2)	Moderate	(9)	(9)	Good	Not suitable
Sogn silt loam (SoB2, SoD, SoD2, SoE, SoE2)	Moderate	(9)		Good	Not suitable
Sparta fine sand and Blown-out land (SpC)	Severe	(9)	Severe	Poor	Suitable
Sparta fine sand and Dune land (SrC)	Severe	(9)	Severe	Poor	Suitable
Sparta loamy fine sand (SsA, SsA2, SsB, SsB2, SsC).	Severe	(9)	Severe	Poor	Suitable

See footnotes at end of table.

properties that affect engineering

Suitability as source of—Con.			Suitability for—				
Fill material for earth embankments [5]			Pond sites [6]	Drainage [7]	Irrigation [8]	Terraces or diversions	Remarks
Surface soil	Subsoil	Substratum					
Fair	(9)	Fair	Questionable	Surface	Good	Suitable	Subject to flooding.
Fair	Fair	Fair	Questionable		Good	Suitable	Subject to flooding.
Fair	Poor	Fair	Questionable	Subsurface	(9)	Suitable	Subject to seepage.
Fair	Fair	Fair	Questionable	Surface	Good	Suitable	Subject to flooding.
Fair	Fair	Fair	Questionable		Good	Suitable	Subject to flooding.
Good	Good	Good	Not suitable		Poor	Not suitable	Very droughty.
Fair	Fair	Fair	Questionable	Surface	(9)	Suitable	
Good	Good	Good	Not suitable		Good	Suitable	Droughty.
Fair	Fair	Poor	Questionable		Good	Questionable	
Fair	Fair	Poor	Suitable		Good	Suitable	
Fair	Poor	Poor	Questionable		Fair	Questionable	
Fair	Fair	Poor	Suitable		Good	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	
Fair	Fair	Poor	Questionable		Good	Questionable	
Fair	Fair	Poor	Suitable		Good	Suitable	
Fair	Poor	Poor	Questionable		Fair	Questionable	
Fair	Fair	Poor	Suitable		Good	Suitable	
Fair	Poor	Poor	Questionable		Fair	Questionable	Many cherty stones.
Fair	Fair	Fair	Suitable		Good	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	
Fair	Fair	Good	Not suitable		Good	Suitable	
Fair	Poor	Fair	Suitable	Subsurface	(9)	Suitable	Poorly drained.
Good	Good	Good	Not suitable		Good	Suitable	Droughty.
Good	Good	Good	Not suitable		Good	Suitable	
Good	Good	Good	Not suitable		Good	Suitable	Droughty.
Good	Good	Good	Not suitable		Good	Suitable	
Fair	Fair	Fair	Questionable		Good	Suitable	
Fair		Fair	Questionable		Good	Suitable	Subject to flooding.
Good	Fair	Good	Not suitable		Good	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	Subject to flooding.
(9)	(9)	(9)	(9)	(9)	(9)	Not suitable	Very high water table.
Fair	Poor	Poor	Suitable		Fair	Suitable	
Fair	Poor	Poor	Suitable	Surface	Poor	Suitable	
Good	Good	Good	Not suitable		Good	Suitable	Droughty.
Good	Fair	Good	Not suitable		Good	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	
Fair	Fair	Poor	Questionable	Subsurface		Suitable	Subject to flooding
Fair	Fair	Fair	Questionable		Good	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	
Good	Fair	Good	Not suitable		Good	Suitable	
Fair	(9)	(9)	Not suitable		Poor	Not suitable	Shallow to bedrock.
Fair	(9)		Not suitable		Poor	Not suitable	Shallow to bedrock.
Fair	(9)	Good	Not suitable		Poor	Not suitable	Very droughty.
Fair	(9)	Good	Not suitable		Poor	Not suitable	Very droughty.
Good	(9)	Good	Not suitable		Fair	Not suitable	Droughty.

TABLE 6.—*Estimated soil*

Soil name [1] and mapping symbol	Erodibility hazard [2]			Suitability as source of—	
	Surface	Subsoil	Substratum	Topsoil [3]	Sand [4]
Sparta loamy fine sand and Blown-out land (StA).	Severe	(9)	Severe	Poor	Suitable
Stony colluvial land (Su)	Moderate	(9)	Moderate	Fair	Not suitable
Stony rock land, steep (Sv)	Moderate	Moderate	Moderate	Variable	Not suitable
Stony rock land, very steep (Sw)	Moderage	Moderate	Moderate	Variable	Not suitable
Stronghurst silt loam (SyB, SyB2)	Moderate	Moderate	Moderate	Good	Not suitable
Tama silt loam (TaA, TaB, TaB2, TaB3, TaC2, TaC3, TaD, TaD2, TaD3).	Moderate	Moderate	Moderate	Good	Not suitable
Terrace escarpments, medium textured (Tc)	Moderate	Moderate	Severe	Good	Suitable
Terrace escarpments, coarse textured (Te)	Severe	(9)	Severe	Poor	Suitable.
Toddville silt loam (To)	Moderate	Moderate	Moderate	Good	Questionable

[1] Consists of soil types and miscellaneous land units mapped in the county; when a mapping unit is made up of two or more soils, the characteristics of both soils should be considered.

[2] The susceptibility of soil materials to erosion by wind or water after the cover of plants has been removed.

[3] Ratings are for use of the soil on embankments and cut slopes, and in ditches, to promote the growth of vegetation.

[4] Principally, the substrata, or underlying material, of soils; does not indicate which deposits are suitable as a source of sand for use in concrete; includes particles with diameters ranging from 0.05 to 2.0 millimeters.

[5] Rating is for use of the soil in embankments or for replacement of unsuitable material.

properties that affect engineering—Continued

Suitability as source of—Con.			Suitability for—				
Fill material for earth embankments [5]			Pond sites [6]	Drainage [7]	Irrigation [8]	Terraces or diversions	Remarks
Surface soil	Subsoil	Substratum					
Fair	(9)	Good	Not suitable		Poor	Not suitable	Very droughty.
Fair	(9)	Fair	Questionable		Poor	Suitable	Very stony.
Fair	Fair	Fair	Questionable		(9)	Not Suitable	Stony.
Fair	Fair	Fair	Questionable		(9)	Not suitable	Stony.
Fair	Fair	Fair	Suitable	Subsurface	(9)	Suitable	
Fair	Fair	Fair	Suitable		Good	Suitable	
Good	Good	Good	Not suitable		Fair	Not suitable	
Good	Good	Good	Not suitable		Poor	Not suitable	Droughty.
Fair	Fair	Fair	Questionable		Good	Suitable	

[6] Refers to the suitability of soil material for construction of ponds for permanent storage of water; the compactability of the soils and the porosity of the underlying material were both considered in this rating; questionable soils should be checked in the field.

[7] Rating concerns suitability for surface and subsurface drainage, if needed; dashes imply drainage is not needed.

[8] Refers to suitability of soils for irrigation, based chiefly on moisture-holding capacity and infiltration rate; does not consider the economic feasibility of providing water for irrigation.

[9] Does not apply; lacks a subsoil, is underlain by bedrock, or is extremely variable.

TABLE 7.—*Engineering test data for soil samples*

[Dashes indicate does not apply

Soil type and laboratory number	Depth	Moisture-density		Mechanical analysis		
		Maximum dry density	Optimum moisture content	Percent passing sieve		
				No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)
Bertrand silt loam:[3]	*Inches*	*Lb. per cu. ft.*	*Percent*			
Wis-2-46	0-7				100	97
Wis-2-49	20-40				100	99
Wis-2-50	40-54				100	99
Downs silt loam:[3]						
Wis-2-37	0-9				100	99
Wis-2-39	14-25				100	99
Wis-2-40	25-38				100	99
Dubuque silt loam:[4]						
S33016	0-5	106	17			
See017	8-16	106	20		100	99
S33018	16-23	84	37	60	43	42
S33019	0-7	89	26		100	99
S33020	19-29	106	21		100	99
S33021	29-44	91	29	89	72	69
Fayette silt loam:[4]						
S31386	0-11	103	17			
S31387	26-33	105	19			
S31388	48-60	107	18			
S31389	0-7	96	21		100	99
S31390	24-35	108	18		100	99
S31391	45-50	113	15	100	99	96
Lindstrom silt loam:[3]						
3230235	0-16				100	96
3230237	25-40				100	96
3230238	40-60				100	97
Meridian sandy loam:[3]						
5574	0-8				100	80
5576	11-19				100	82
5578	28-34				100	73
Richwood silt loam:[3]						
5330	0-8				100	99
5334	23-30				100	99
5336	37-60				100	99
Sparta fine sand:[3]						
Wis-3-42	0-7				100	72
Wis-3-43	7-16				100	63
Wis-3-44	16-45				100	69

[1] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1., ed. 7): The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145-49. Classification for soil types represented by SCS test data are estimated.

[2] Based on the Unified Soil Classification System, Tech. Memo. No. 3-357, v. 1, Waterways Exp. Sta. Corps of Engin., U.S. Army. March 1953. Classification for soil types represented by SCS test data are estimated.

taken from 10 soil profiles of 8 soil types

or information is not available]

Mechanical analysis—Continued						Liquid limit	Plasticity index	Classification	
Percent passing sieve—Con.		Percent smaller than—							
No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [1]	Unified [2]
96	91	90	50	18	12	20	4	A–4	ML–CL.
99	96	95	60	37	31	46	24	A–7–6	CL.
98	96	94	57	33	28	42	21	A–7–6	CL.
99	99	97	61	32	29	43	22	A–7–6	CL.
99	99	97	59	34	25	37	18	A–6	CL.
99	99	97	60	31	26	37	17	A–6	CL.
100	98	94	60	27	18	31	7	A–4(8)	ML–CL.
98	97	95	69	37	29	36	13	A–6(9)	ML–CL.
41	40	39	34	31	29	76	39	A–7–5(6)	GM.
98	94	91	56	22	10	41	7	A–5(8)	ML.
98	94	91	60	34	30	40	18	A–6(11)	CL.
65	58	56	50	45	44	64	33	A–7–5(15)	MH–CH.
100	99	90	58	20	14	29	5	A–4(8)	ML–CL.
----------	100	97	64	36	30	44	20	A–7–6(13)	CL.
----------	100	96	60	30	25	38	16	A–6(10)	CL.
98	96	94	58	22	15	36	7	A–4(8)	ML.
98	96	93	61	32	26	38	16	A–6(10)	CL.
91	84	81	52	27	24	34	14	A–6(10)	CL.
90	78	69	52	31	25	37	18	A–6	CL.
91	85	82	55	31	24	36	17	A–6	CL.
96	89	84	47	23	19	28	11	A–6	CL.
58	30	29	17	9	6	----------	----------	A–2–4	SM.
66	45	43	29	17	11	----------	----------	A–4	SM.
48	9	8	5	4	3	----------	----------	A–2–4	SP–SM.
99	95	93	50	22	16	24	6	A–4	ML–CL.
99	97	95	50	31	25	37	18	A–6	CL.
99	97	93	46	28	23	34	15	A–6	CL.
45	13	12	8	5	4	----------	----------	A–2–4	SM.
41	15	13	10	9	6	----------	----------	A–2–4	SM.
45	13	11	6	5	4	----------	----------	A–2–4	SM.

[3] Test data from U.S. Soil Conservation Service. The liquid limit and plasticity index are estimates based on comparisons with other soils.

[4] Tests performed by the U.S. Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials.

TABLE 8.—*Soil series arranged by position, and their parent material, original vegetation, and natural drainage*

UPLANDS

Position on the landscape	Parent material	Depth	Original vegetation	Natural drainage					
				Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
		Inches							
Ridgetops	Silt (loess)	42+	Prairie			Tama		Muscatine [1]	Garwin.
Ridgetops	Silt (loess)	42+	Prairie-Forest.[1]			Downs		Atterberry	
Ridgetops	Silt (loess)	42+	Forest			Fayette, uplands.	Rozetta	Stronghurst.	
Valley slopes	Local alluvium, mainly loess but partly drift and materials weathered from sandstone and limestone.	42+	Prairie			Lindstrom.			
Valley slopes	Silt (loess)	42+	Forest			Fayette, valleys.			
Ridgetops	Loam and silt loam on limestone.	Less than 12.	Prairie		Sogn				
Ridgetops	Silt (loess)	42+	Forest			Seaton			
Ridgetops	Silt and sand	42+	Forest		Lamont				
Valley slopes	Windblown sand	42+	Forest	Chelsea					
Ridgetops	Silt (loess) on red clay.	18 to 42	Prairie			Dodgeville.			
Ridgetops	Silt on red clay	18 to 42	Forest			Dubuque			
Valley slopes	Silt on sandstone	24 to 36	Forest			Gale			
Valley slopes	Fine-grained sandstone.	18 to 40	Prairie			Hesch			
Valley slopes	Fine-grained sandstone.	20 to 36	Forest			Hixton			
Foot slopes and ravines.	Local alluvium	42+	Prairie			Judson [2]			
Foot slopes and ravines.	Local alluvium	42+	Forest			Chaseburg.[2]			

TERRACES

High to medium	Silt (old alluvium)	42+	Prairie			Richwood.	Toddville.		
High to medium	Silt (old alluvium)	42+	Forest			Bertrand	Jackson	Curran	
High to medium	Lacustrine silt and clay.		Forest				Medary		
Medium	Fine sandy loam over sand.	24 to 38	Prairie			Dakota			
Medium	Loam and fine sandy loam over sand.	24 to 36	Forest			Meridian			
Low	Outwash sand	18 to 24	Prairie	Sparta					

BOTTOM LANDS

Medium	Silty alluvium	30+	Forest			Arenzville.[2]		Orion	

[1] Includes some areas that are moderately well drained. [2] Well drained to moderately well drained.

Living organisms

Plants and animals are active in the soil-forming processes. The nature of the changes they bring about depends, among other things, upon the kind of life and life processes peculiar to each. The kinds of plants and animals that live on and in the soil are affected, in turn, by the climate, parent material, relief, and age of the soil, and by other living organisms.

Most of the soils in the county have formed under a deciduous forest. The principal trees were maple, basswood, oak, and hickory, but there were several less important species. These soils are lighter colored than the soils formed under prairie or soils that are transitional to prairie soils. The native vegetation in areas of prairie soils was tall grasses or deciduous trees that had an understory of prairie plants.

The trees and shrubs growing in the county have roots that penetrate moderately deep to feed on the plant nutrients in the soil. Most of them shed their leaves annually. The content of plant nutrients in the leaves varies among the different species. Generally, however, considerable amounts of bases and phosphorus are returned to the soil by the leaves. Through this cyclical exchange, plant nutrients are returned to the upper part of the soil from the lower layers and partly replace those leached out by percolating water.

Much organic material is added to the soil through the decay of leaves, twigs, roots, and entire plants. The plant nutrients released by decomposition thus become available for the growth of new plants. Where soils formed under forest, most of the organic matter accumulates on the surface where it is acted on by micro-organisms, earthworms and other forms of life, and by direct chemical action. Where soils formed under prairie, much of the organic matter accumulates below the soil surface through decomposition of the roots of prairie grasses.

As organic material decays, it releases organic acids that make the slowly soluble mineral materials in the soil more soluble. Consequently, the leaching and translocation of inorganic materials is hastened. The rate of decomposition is strongly influenced by temperature and by the amount of moisture present. The short summers and cold winters in Grant County slow decomposition and reduce the amount of leaching, thus helping to hold plant nutrients in the soil.

Parent materials

The parent materials of the soils in this county consist of (1) residual materials derived from the weathering of rocks in place, and (2) materials transported by wind, water, or gravity and laid down as unconsolidated deposits of silt, sand, clay, and fragments of rock. Materials of the first group are related directly to the underlying rock from which they were derived; materials of the second group are related to the transported soils or rocks from which they were derived.

The parent materials formed in place consist of weathered products of sedimentary rocks. Because these rocks differ greatly in chemical and mineralogical composition, the soils formed from them also differ.

A large part of the bedrock in Grant County is made up of Upper Magnesian dolomite of the Galena and Platteville formations. In the northern part of the county, there are fairly large areas in which Cambrian sandstone and Lower Magnesian dolomite of the Prairie du Chien formation underlie the soils. Outcrops of St. Peter sandstone occur along the bluffs of the rivers and in the more highly dissected parts of the county. The Hixton and Hesch soils occur in parts of the county underlain by Cambrian sandstone.

Transported materials consist of (1) windblown silt and very fine sand, or loess, deposited throughout the county in a blanket of variable thickness; (2) water-deposited material, or alluvium, laid down on stream bottoms and terraces; and (3) colluvium, deposited partly by gravity and partly by water, on the foot slopes below steep bluffs.

Soils formed wholly or partly from loess overlie all of the geologic formations in the county. The kind of soil formed in loessal material is determined primarily by the effects of different kinds of vegetation and by the thickness of the deposit. Where there is only a thin mantle of loess, the kind of soil is determined mainly by the underlying residual material. For example, the Dubuque and Dodgeville soils occur in areas where the mantle of loess is thin. They have formed partly from loess and partly from the underlying red clay weathered from dolomite bedrock; the Fayette and Tama soils have formed in areas where the mantle of silt is thicker.

Soils formed in sand and silt deposited by water occur on terraces and throughout the stream bottoms. The kind of soil that forms in this water-deposited material is determined by the thickness and texture of the deposit and by natural drainage. Of the soils on terraces, the Bertrand and Richwood are silty and have formed in water-deposited materials; the Dakota and Meridian are loamy. Sandy soils formed in transported materials are the Chelsea and Sparta.

Relief

Relief ranges from level to very steep in Grant County (fig. 14). In steep areas large amounts of water run off the surface. As a result, erosion is rapid and keeps an almost even pace with the weathering of rocks and with soil formation. The soil materials in such areas are being constantly removed and do not remain in place long enough for genetically related soil horizons to form. Soils on these steep slopes have shallow profiles and, in places, outcrops of rock. Little water percolates through these soils, and the degree of leaching and the amount of translocated materials, therefore, are small.

Most of the soils in this county have formed on slopes that favor the development of well-expressed soil profiles. Examples of such soils are those of the Bertrand, Fayette, and Tama series. A few areas in depressions or on bottom lands have slow surface runoff and internal drainage. The soils in these areas differ from the soils of well-drained areas in having a somewhat compact subsoil that is mottled with yellow and gray. The vegetation growing on these wetter areas differs from that on the well-drained soils, and the micro-organisms are also different. These soils are not so well aerated as better drained soils, and conditions are less favorable for organic matter to decompose rapidly than they are in the well-drained soils.

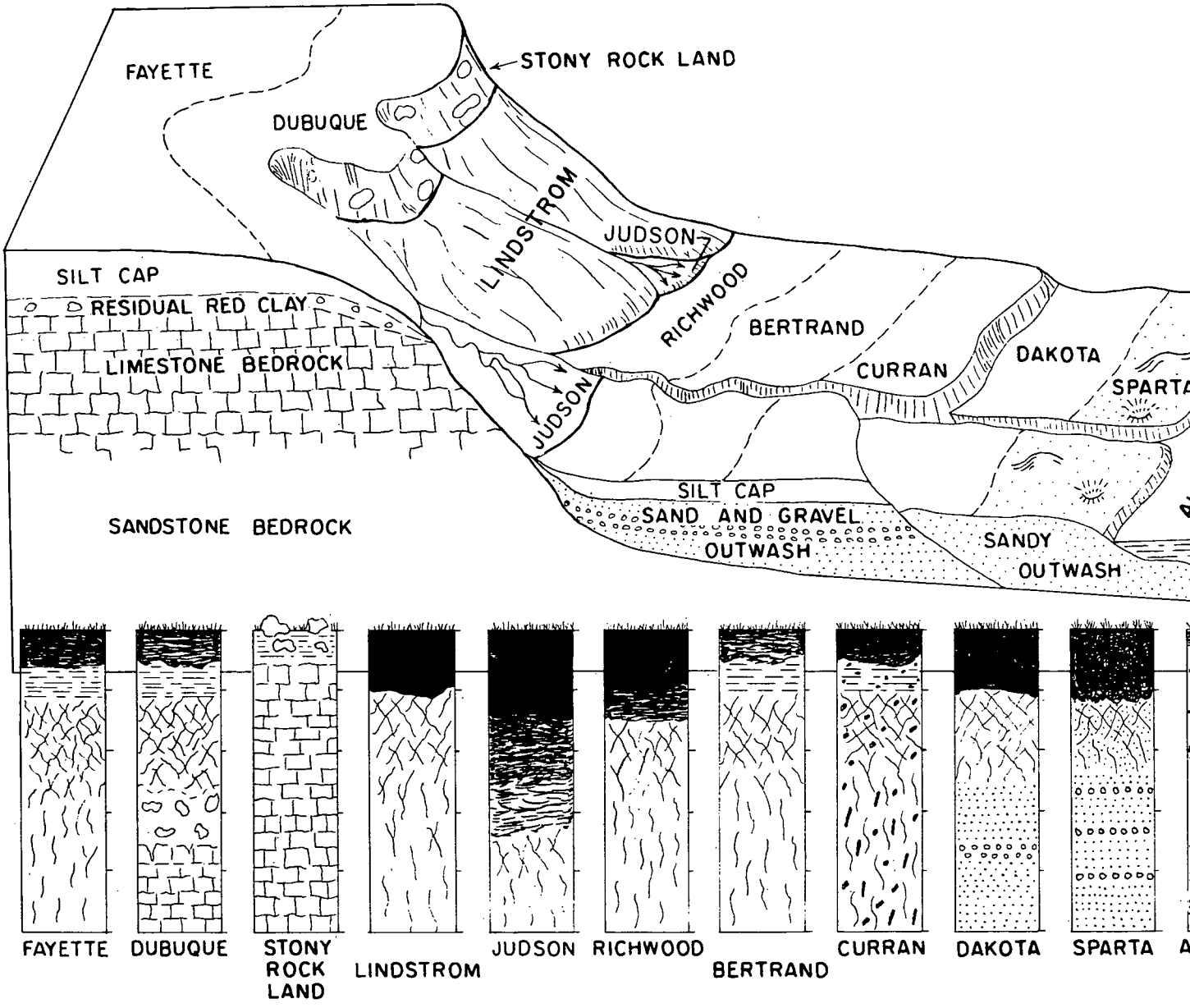

Figure 14.—Landscape of Grant County showing the relationship of the major soil series.

Time

The soils of this county differ little because of age. The loessal soils of the uplands have about the same degree of profile development as the soils formed in silty deposits on terraces and are probably of about the same age. The youngest soils in the county are those that have formed in alluvium. These soils have little or no horizon development because of the brief time their parent materials have been in place.

Classification of Soils

One of the main objectives of a soil survey is to describe and identify the soils and to determine their relationship to agriculture. A second objective is to group the soils according to common characteristics. Such a grouping will show the relationship of the soils to one another and to soils of other areas. This is necessary because there are so many different kinds of soils that it would be difficult to remember the characteristics of all of them. If the soils are placed in a few groups, each group having selected characteristics in common, their general nature can be remembered more easily.

The soil classification used has several steps, or categories. The lower categories—soil phase, soil type, and soil series—are discussed in the section, How a Soil Survey is Made. Soil series are also grouped into higher categories—great soil groups and soil orders (*7*). These relationships are shown in table 9. All three soil orders—the zonal, intrazonal, and azonal—are represented in this county.

The zonal group is made up of soils that have well-developed soil profiles. The soils reflect the predominant influence of climate and living organisms in their formation. In Grant County the zonal soil order is made up of Gray-Brown Podzolic soils and Brunizems (Prairie soils).

Intrazonal soils have more or less well-developed soil characteristics that reflect the dominant influence of a local factor of relief or parent material over the effects of climate and living organisms. These soils are commonly associated with soils of the zonal group. In this county soils of the Humic Gley great soil group are in the intrazonal order.

The azonal order is made up of soils that, because of youth, resistant parent material, or relief, lack well-developed profiles. The azonal soils in this county belong to the Alluvial, Lithosol, and Regosol great soil groups.

The great soil groups are described in the following pages along with the series in each group. This classification is incomplete and may be revised as knowledge of the soils increases. Several of the soil series in the county are not representative of any one great soil group but intergrade from one great soil group to another.

The county is in the so-called Driftless Area. It is in the western part of the Gray-Brown Podzolic soil region of North America and includes some areas of Brunizems. The county is within the Fayette-Dubuque and Tama-Dodgeville soil areas of Wisconsin (*6*).

Gray-Brown Podzolic soils

Gray-Brown Podzolic soils belong to the zonal order. These soils have a fairly thin organic covering (A_0) and organic-mineral layer (A_1) that overlies a grayish-brown, leached A_2 horizon. The A_2 horizon rests upon an illuvial, brownish-colored, blocky B horizon.

These soils have formed under deciduous trees in a temperate, moist climate. Podzolization was the chief process in their development. The soils of this group occupy the major part of Grant County. The soil series in this great soil group are:

Atterberry.	Fayette.	Medary.
Bertrand.	Gale.	Meridian.
Curran.	Hixton.	Rozetta.
Downs.	Jackson.	Seaton.
Dubuque.	Lamont.	Stronghurst.

TABLE 9.—*Classification of soil series by higher categories*

Great soil group and series	Remarks
ZONAL	
Gray-Brown Podzolic soils:	
Atterberry	Intergrades toward Brunizems.
Bertrand.	
Curran	Intergrades toward Low-Humic Gley soils.
Downs	Intergrades toward Brunizems.
Dubuque.	
Fayette.	
Gale.	
Hixton.	
Jackson.	
Lamont.	
Medary.	
Meridian.	
Rozetta.	
Seaton.	
Stronghurst	Intergrades toward Low-Humic Gley soils.
Brunizems (Prairie soils):	
Dakota.	
Dodgeville	
Hesch.	
Lindstrom.	
Muscatine.	
Richwood.	
Tama.	
Toddville.	
INTRAZONAL	
Humic Gley soils:	
Garwin.	
AZONAL	
Alluvial soils:	
Arenzville.	
Chaseburg	Intergrades toward Gray-Brown Podzolic soils.
Judson	Intergrades toward Brunizems.
Orion.	
Lithosols:	
Sogn	Intergrades toward Brunizems.
Regosols:	
Chelsea	Intergrades toward Gray-Brown Podzolic soils.
Sparta	Intergrades toward Brunizems.

The soils of the Fayette series are among the most important of the Gray-Brown Podzolic soils in the county. They have formed under forest in a fairly thick deposit of loess. The thickness of the loess varies. It ranges from 20 feet or more in areas near the Mississippi River to about 4 feet thick in the northeastern part of the county. These soils are well drained and occur on rolling to steep uplands.

The following is a typical profile of Fayette silt loam, uplands, 2 to 6 percent slopes, in a forested area near the center of section 6, Smelser Township:

- A_0 ½ to 0 inch, of forest litter.
- A_1 0 to 2½ inches, very dark grayish-brown (10YR 3/2)[6] silt loam; weak, thin, platy structure breaking to moderate, fine granules; friable; fine roots abundant; pH 6.5.
- A_2 2½ to 14 inches, pale-brown (10YR 6/3) silt loam; moderate, thin, platy structure; friable; slightly vesicular; tree roots plentiful; pH 5.5.
- B_1 14 to 17 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, subangular blocky structure; friable; light-gray (10YR 7/2) silica coatings on ped surfaces; roots plentiful; pH 5.2.
- B_2 17 to 32 inches, yellowish-brown (10YR 5/4 to 5/6), light silty clay loam; moderate to strong, medium, subangular blocky structure; firm; light-gray (10YR 7/2) silica coatings on ped surfaces; pH 5.1.
- B_3 32 to 40 inches, yellowish-brown (10YR 5/6), heavy silt loam; moderate, coarse, subangular blocky structure; friable; pH 5.5.
- C_1 40 inches +, yellowish-brown (10YR 5/6) silt loam; massive (structureless); friable; pH 5.8.

The silty parent material is calcareous at depths between 60 and 70 inches in many places; at depths below 80 inches, it has a neutralizing value of 15 to 20 percent in many places. The underlying red clay residuum or limestone bedrock is at depths of 3½ to more than 20 feet. In areas near the Mississippi River, this soil has a somewhat more friable B horizon and contains larger amounts of coarse silt and very fine sand than the more typical Fayette soils in other parts of the county.

The differences among the Gray-Brown Podzolic soils in Grant County are related to differences in parent materials, relief, and drainage. The Rozetta soils, for example, have formed from materials similar to those of the Fayette soils. The Rozetta soils, however, are moderately well drained and have a B horizon that is more grayish in the upper part than that of the Fayette soils and slightly mottled in the lower part. The soils of the Hixton series have formed from sandstone. Consequently, they are somewhat coarser textured throughout than soils formed from silty material. The Gale and Dubuque soils have formed in a thin mantle of silt. The Gale soils, however, are underlain by sandstone, and the Dubuque soils, by red clay weathered from limestone or by limestone bedrock. As a result, the Gale and Dubuque soils have similar upper horizons but differ in subsoil characteristics. Also, the Gale soils are somewhat more droughty and, in places, have steeper slopes. The Lamont and Seaton soils have formed from coarse silt and very fine sand that was blown onto the bluffs of the Mississippi and Wisconsin Rivers by wind. The B horizon of these soils is weakly developed. These soils also erode easily and are somewhat droughty.

The differences between terrace soils, such as the Bertrand and Meridian, are related primarily to the thickness of the loessal parent material over the underlying sands. The Jackson soils have formed from materials similar to those of the Bertrand soils, but the Jackson soils are moderately well drained instead of well drained and have a B horizon that is more grayish in the upper part and slightly mottled in the lower part. The Medary soils differ from the other terrace soils in having formed in silt that overlies lacustrine deposits on old lake terraces. These soils of the terraces all have well-expressed characteristics typical of the Gray-Brown Podzolic soils.

The Curran and Stronghurst soils are somewhat poorly drained. They have formed in materials similar to the parent materials of the Fayette, Rozetta, Bertrand, and Jackson soils. The Curran and Stronghurst soils have an A_1 horizon that is thicker and darker than that of the Rozetta and Jackson soils; they also have a more highly mottled B horizon. Because of these characteristics, the Curran and Stronghurst soils have been classified as Gray-Brown Podzolic soils intergrading to Low-Humic Gley soils.

The Atterberry and Downs soils are intermediate between the light-colored Gray-Brown Podzolic soils of the Fayette and Rozetta series and the darker colored Brunizem soils of the Tama and Muscatine series. They are classified as Gray-Brown Podzolic soils integrading to Brunizems. The Atterberry soils are similar to the Downs soils, but their B horizon is grayer in the upper part and mottled in the lower part.

Brunizems

The Brunizems, or Prairie soils, have formed in a temperate, moderately humid climate under a cover of tall grasses. They do not have accumulations of calcium carbonate derived from soil-forming processes in any part of the profile. They characteristically have a very dark brown, or grayish-brown, thick A horizon.

In this county, the soil series in this great soil group are:

Dakota.	Muscatine.
Dodgeville.	Richwood.
Hesch.	Tama.
Lindstrom.	Toddville.

The soils of the Tama series are the most extensive of the Brunizem soils in the county. They have formed in moderately deep to deep deposits of loess. The loess is similar to that in which the Fayette soils formed. Prairie grasses were the native vegetation. The Tama soils that have formed in thick deposits of silt are calcareous at depths between 60 and 70 inches, but no free lime occurs in Tama soils that have formed in the thinner deposits of silt.

The following is a typical profile of Tama silt loam, 2 to 6 percent slopes, observed in a cornfield in the south-central part of section 22, Platteville Township:

- A_p 0 to 8 inches, black (10YR 2/1) silt loam; moderate, fine crumb structure; friable; roots numerous; pH 7.0.
- A_3 8 to 16 inches, very dark gray (10YR 3/1) silt loam; moderate, coarse, granular structure; friable; roots abundant; pH 6.1.
- B_1 16 to 20 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, subangular blocky structure; friable; moist; roots plentiful; pH 5.3.
- B_2 20 to 36 inches, dark-brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; firm; pH 5.1.

[6] Symbols express Munsell color notations; unless otherwise stated color is that of moist soil.

B_3 36 to 42 inches, brown to yellowish-brown (10YR 5/3 to 5/4), heavy silt loam; weak, coarse, subangular blocky structure; friable; pH 6.0.

C_1 42 inches +, yellowish-brown (10YR 5/4 to 5/6) silt loam; massive (structureless); friable; pH 6.2 in the upper part; calcareous at depths below 70 inches.

The surface horizon of the Tama soils varies in color and thickness. In some places the Tama soils grade toward the nearby Muscatine soils, which are somewhat poorly drained but include moderately well drained areas. In these places the B horizon of the Tama soils is grayer than normal in the upper part; also, mottles occur in places in the lower part of the B horizon or upper part of the C horizon.

The Lindstrom soils are inextensive. They have formed in silty local alluvium washed from areas of Tama and Hesch soils. The profile of the Lindstrom soils is more weakly expressed than that of the Tama soils and contains more grit. The Hesch soils have formed from weathered sandstone similar to the parent material of the Hixton soils. The Hesch soils, however, have a thicker, darker A_1 horizon than that of the Hixton soils and lack an A_2 horizon. The Dodgeville soils occur near the Tama soils but have formed partly in loess and partly in the underlying red clay residuum or limestone. The Dodgeville soils are the Brunizem equivalents of the Gray-Brown Podzolic soils of the Dubuque series.

The Dakota soils have formed on sandy outwash plains and stream terraces. They occur near the Sparta soils, but they have a somewhat darker, finer textured A horizon and a more strongly expressed B horizon than the Sparta soils. In many places the Dakota soils lie between Sparta soils and the surrounding upland bluffs.

The Richwood soils resemble the Tama soils but have formed on terraces in silt laid down by wind and water. The Toddville soils, which are moderately well drained, occur near the Richwood soils. Also, in contrast to the Richwood soils, the Toddville soils have a B horizon that is grayer in the upper part and mottled in the lower part.

Humic Gley soils

Humic Gley soils belong to the intrazonal order. These soils have formed in depressions where water tends to accumulate and internal drainage is slow to very slow. The Humic Gley soils have a thick, black or very dark grayish-brown A_1 horizon that has a high content of organic matter. The subsoil is strongly gleyed; gray colors predominate immediately below the A_1 layer, and mottling predominates in the lower part. These characteristics show the influence of excess moisture and restricted aeration on the rate of production and decomposition of organic materials and on the reduction and translocation of iron compounds in the soil profile. In Grant County only the Garwin series is in this great soil group.

The following is a typical profile of Garwin silty clay loam observed in the northwest corner of section 29, Hazel Green Township:

A_1 0 to 8 inches, black (N 2/0) silty clay loam; moderate, coarse, granular structure; friable; high content of organic matter; numerous wormcasts and roots; pH 7.5.

A_3 8 to 15 inches, very dark gray (N 3/0) silty clay loam; moderate, medium, granular structure; friable; high content of organic matter; pH 7.5.

B_{1g} 15 to 22 inches, dark-gray (N 4/0) and (10YR 4/1) silty clay loam mottled with strong brown (7.5YR 5/8); moderate, fine, subangular blocky structure; firm when moist; pH 8.0.

B_{2g} 22 to 30 inches, dark-gray (10YR 4/1), heavy silty clay loam mottled with strong brown (7.5YR 5/8); moderate, medium, subangular blocky structure; very hard when dry, firm when moist, and plastic when wet; pH 8.0.

C_{1g} 30 to 40 inches, light brownish-gray (2.5Y 6/2), heavy silt loam, mottled with yellowish brown (10YR 5/8); massive (structureless); friable; a few krotovinas of darker colored organic matter in root channels; a few iron and manganese concretions; pH 8.0.

C_{2g} 40 inches +, light brownish-gray (2.5Y 6/2), heavy silt loam more highly mottled and somewhat more friable than the horizon immediately above; massive (structureless); a few krotovinas of darker colored organic matter in root channels; a few iron and manganese concretions; pH 8.0.

The A horizon of Garwin silty clay loam varies in color, and the B_g and C_g horizons vary in color and in degree of mottling.

Alluvial soils

Alluvial soils are azonal soils. They are forming from materials transported by water and recently deposited on flood plains and foot slopes. These soils have little or no profile development. They receive fresh deposits of material during each flood. In some places floods remove part of the surface material.

In Grant County the following series are in this great soil group:

Arenzville.	Judson.
Chaseburg.	Orion.

The Arenzville soil is an example of an Alluvial soil in this county. It is moderately well drained to well drained. This soil occurs on flood plains and is forming in medium-textured alluvium washed from areas of Fayette, Dubuque, Gale, and Hixton soils. It is subject to overflow unless protected.

The following is a typical profile of Arenzville silt loam observed in a cornfield near Grant River in the northwestern corner of section 22, Beetown Township:

A_p 0 to 8 inches, dark-gray (10YR 4/1) silt loam; moderate, medium, granular structure; friable; many roots and earthworm casts; a recent deposit of slightly mottled material, about 1 inch thick, has been added at the surface by floodwaters; pH 7.5.

A_1 8 to 15 inches, dark-gray (10YR 4/1), pale-brown (10YR 6/3), and brown (10YR 5/3) silt loam; weak, medium, granular structure; friable; has thin seams of fine sandy loam and some thicker seams of brown silt loam; roots numerous; pH 7.5.

C 15 to 40 inches, pale-brown (10YR 6/3), brown (10YR 5/3), and dark grayish-brown (10YR 4/2) silt loam; massive (structureless); friable; the lighter colored materials have a fine sandy loam texture and occur in thin strata; this horizon shows considerable crossbedding and no structural or textural development; pH 7.0.

A_{1b} 40 to 48 inches +, dark grayish-brown (10YR 4/2) silt loam; massive (structureless); friable; considerable crossbedding and stratification; pH 7.5.

In most places there is a darker colored A_{1b} horizon, or buried surface soil, at depths of 42 to 72 inches. In many places, the soil is slightly mottled at depths below 36 inches. Generally, the soil is neutral to mildly alkaline throughout the profile. The surface soil varies in color.

The somewhat poorly drained Orion soil occurs near the Arenzville soil. The Orion soil, however, is faintly mottled immediately below the A_1 horizon. The Chaseburg and Judson soils are young soils. They are forming in local deposits on colluvial foot slopes. Because of their weakly expressed profiles these soils are classified as Alluvial soils, but each is intergrading to some other great soil group. The Judson soils have an incipient, dark-colored surface horizon. As a result, they are considered as intergrades toward the Brunizem great soil group. The Chaseburg soils have a lighter colored surface horizon and an incipient B horizon, which indicates they are intergrades toward the Gray-Brown Podzolic great soil group.

Lithosols

Typically, Lithosols are shallow and have little or no profile development. They consist mainly of partly weathered fragments of rock or nearly barren rock. In Grant County the Sogn soils are classified as Lithosols. The thickness and dark color of the A_1 horizon and the occurrence of an incipient B horizon in places where the soil material is thickest indicate that the Sogn soils are intergrading to Brunizems. In some places the Sogn soils are similar to the shallower Dodgeville soils. Typically, however, the Sogn soils have slabs of limestone and fragments of chert on the surface and throughout the profile. Partly shattered dolomite bedrock generally occurs at depths of less than 12 inches.

Regosols

Regosols are an azonal group of soils forming in deep, unconsolidated deposits of geological materials. They show little or no horizon differentiation. In this county the following soils are in this group:

Chelsea. Sparta.

The Chelsea and Sparta soils are not typical Regosols, and both are intergrading to other great soil groups. The soils of both series are sandy and are excessively well drained. They are developing in deep, unconsolidated deposits of loose, fine sand. The Chelsea soils have formed under forest. They have subsoil horizons of yellowish-brown fine sand that contains thin, discontinuous, darker colored bands at depths below 4 or 5 feet; the bands are redder in color and contain slightly more iron oxide and clay than the sandy materials between them. Because of the weakly banded lower subsoil, the Chelsea soils are classified as Regosols intergrading to Gray-Brown Podzolic soils. The Sparta soils, on the other hand, have formed under prairie. They have a fairly thick, dark-colored A_1 horizon but lack a B horizon. They are classified as Regosols intergrading to Brunizems.

Agriculture

Grant County is located along the northern edge of the major corn-producing area of the United States. The agricultural economy of the county relies largely upon the raising of hogs and beef cattle, but dairy farming is also important. The more outstanding features of the agriculture are discussed in the following pages. Statistics used are from reports published by the United States Bureau of the Census.

Land Use

Farms occupy 89 percent of the total land area of Grant County. The farmland by use and the acreage used for each purpose in 1954 are as follows:

	Acres
Cropland, total	352,386
Harvested	297,414
Used only for pasture	48,467
Not harvested or pastured	6,505
Woodland, total	159,864
Pastured	137,318
Not pastured	22,546
Other land pastured (not cropland and not woodland)	121,685
Land pastured, total	307,470
Other land (house lots, roads; wasteland, and so on)	31,113

The acreage from which crops are harvested is somewhat smaller than in most counties in southeastern Wisconsin. This is because many areas in the county are too rugged to be used for tilled crops. Practically all of the accessible land suitable for crops is now used for crops or pasture. Approximately one-fourth of the land in farms is wooded.

Type and Size of Farms

In 1954, there were 3,533 farms in Grant County. Of these, 283 were miscellaneous and unclassified. The rest are listed according to the major source of income as follows:

	Number
Dairy farms	1,420
Livestock other than dairy and poultry	1,469
General farms	266
Primarily livestock	180
Primarily crop	1
Crop and livestock	85
Cash grain	70
Poultry	25

Sale of livestock and livestock products accounted for slightly more than 95 percent of the income on the farms in 1954. The raising of hogs and dairy cattle are both important. Little income is derived from the sale of crops.

The size of farms varies considerably, but the average-sized farm in 1954 was 188.2 acres. The larger farms are generally in the northern and central part of the county where broad terraces and gently sloping uplands, well suited to farming, are the most extensive. In 1954, farms were classified by size as follows:

Size of farms (acres):	*Number*
Under 10	66
10 to 29	90
30 to 49	97
50 to 69	68
70 to 99	304
100 to 139	623
140 to 179	693
180 to 219	535
220 to 259	357
260 to 499	631
500 to 999	65
1,000 acres and larger	4

Crops

Most of the crops grown in the county are used to provide feed for livestock. The most common cropping system consists of growing corn and oats for 1 year each and then hay for 2 years. Cash crops are grown on some farms. The most important cash crops are potatoes, tobacco, tree fruits, sweet corn, and peas. The acreage of the various crops grown in stated years is shown in table 10.

TABLE 10.—*Acreage of principal crops and number of apple trees of bearing age*

Crop	1939	1949	1954
Corn for all purposes:	*Acres*	*Acres*	*Acres*
Harvested for grain	76, 259	88, 314	88, 289
Cut for silage	11, 365	9, 959	10, 017
Hogged, grazed, or cut for fodder	2, 648	6, 716	5, 932
Soybeans for all purposes	6, 134	777	643
Small grains threshed or combined:			
Grown together and threshed as a mixture	9, 837	7, 799	3, 552
Oats	65, 856	78, 971	81, 773
Spring wheat	554	1, 637	570
Winter wheat	463	171	65
Barley	4, 978	674	1, 094
Rye	1, 250	512	216
Hay total	106, 356	106, 475	108, 232
Alfalfa and alfalfa mixtures	35, 839	60, 377	80, 361
Clover, timothy, and mixtures with grasses	57, 804	42, 692	23, 231
Small grain hay	2, 114	227	349
Wild hay cut	1, 246	455	182
Other hay cut	9, 353	1, 213	581
Silage from grasses or hay crops	(1)	1, 511	3, 528
Red clover harvested for seed	(1)	5, 890	1, 058
Irish potatoes	2, 050	306	102
Tobacco harvested	80	102	50
	Number [2]	*Number* [2]	*Number* [3]
Apple trees	17, 762	22, 747	2, 465

[1] Not reported.
[2] One year later than the year given at head of column.
[3] Does not include acreage for farms with less than 20 trees.

Corn is an important crop in this county. Practically all of it is used on the farm to provide feed for hogs and cattle. Most of it is grown on the more nearly level areas in the county. If corn is to be grown, the soil is usually plowed in spring and prepared for seeding in May. Harvesting of the corn for grain takes place in October or November, depending upon the weather. If the corn is cut for silage, it is harvested when the grain begins to dent or, if there has been an early frost, as soon after the frost as possible.

Oats have always been grown extensively in Grant County. They are generally planted as a nurse crop for hay. If oats are to be planted, the fields are often plowed in fall. In spring they are disked and smoothed, and the oats are seeded in April or before the 15th of May. A grain drill is generally used for seeding, but the oats can be broadcast and covered by harrowing. Fertilizer is sometimes used to increase yields and to assure a better stand of the accompanying hay crop.

After the oats mature, they are harvested by using a binder or combine. Most of them are ground, mixed with protein concentrates, and fed on the farm. The straw is baled and used as bedding. In some places oats are used as a supplementary hay crop and are cut green.

Because dairy farming is important in the county, hay crops are grown extensively. Also, many of the soils have strong slopes and are better suited to grasses and legumes than to cultivated crops. Hay crops were grown on about 31 percent of the available cropland in 1954.

Alfalfa and alfalfa mixtures were grown on about 74 percent of the total acreage used for hay crops in 1954. As a rule, alfalfa gives higher yields of good-quality forage than other kinds of hay. It needs a fertile, well-drained soil, and, to yield well, it requires lime, potash, and phosphate. The alfalfa is generally seeded in April, with oats or with some other nurse crop, in a mixture consisting of alfalfa and bromegrass or of alfalfa, clover, and timothy. Ordinarily, two cuttings are made each season, and sometimes the alfalfa is pastured in fall.

Second to alfalfa, the crops most widely used for hay are clover and timothy grown together. The mixture commonly used for seeding consists of 5 pounds per acre of red clover, 3 pounds of alsike clover, and 2 pounds of timothy. This mixture is generally seeded in April with oats or with some other small grain used as a nurse crop. The seed is drilled in with the small grain, or it is broadcast after the small grain has been seeded.

Tobacco is a minor cash crop in the county, but it is an important source of income on a few farms. The acreage used for this crop has never been large. State records show that tobacco was grown on only 20 acres in 1933, which is the smallest acreage reported for any year. The largest acreage, 294 acres, was reported in 1909.

Tobacco is usually grown on bottom lands or on terraces. The soils used are the most fertile of any on the farm. As a rule, large amounts of manure and commercial fertilizer are added before the crop is planted. A high level of fertility must be maintained for this crop; consequently, tobacco is not generally rotated with other crops.

The soils to be used for tobacco are plowed in fall. The following spring the seedbed is well prepared before planting. The tobacco plants are transplanted to the fields in June or no later than July 8. Weeds are controlled mainly by cultivating. When the top leaves of the tobacco begin to turn yellow, the crop is harvested.

Soybeans were introduced in the county around 1930. Although they could be grown on many of the soils used for corn, they have been grown on only a small acreage. When the clover or alfalfa crop fails, soybeans are often used as a catch crop and are fed to livestock. Soybeans are generally planted in May. The preparation of the seedbed is similar to that needed if corn is to be grown, and about the same kinds and amounts of fertilizer are needed.

Wheat, rye, and barley were important as feed and cash crops in the early history of the county. As the livestock industry grew, however, they became less important.

Although potatoes were important at one time, they are no longer grown extensively, except for use on the farm. On most farms some vegetables and fresh fruits are

grown for home use. Sweet corn and peas are grown extensively on some farms and contribute much to the farm income, and apple orchards are important on some farms. Maple sirup and honey are produced for market to some extent, especially in the more rugged parts of the county.

Permanent Pastures

About 46 percent, or 307,470 acres, of the land in farms in 1954, was used for pasture. Of this acreage, about 45 percent was pastured woodland. The largest areas used as woodland pastures are in Wyalusing, Watterstown, Waterloo, Muscoda, North Lancaster, and Castle Rock Townships. The largest cleared areas used for pasture are in Liberty, Marion, Cassville, Beetown, Mount Hope, and South Lancaster Townships. The most common plants in the permanent pastures are Kentucky bluegrass, whiteclover, redtop, and timothy.

A large number of the permanent pastures are on soils not well suited to crops. Many of the permanent pastures provide little forage, but they can be improved by renovating them. Experiments show that 1 acre of renovated pasture is equal to between 2 and 5½ acres of untreated pasture, or to 11.3 acres of woodland pasture (*2*).

When pastures are renovated, lime and a complete fertilizer are broadcast. The amounts used are determined by soil tests based upon the needs of alfalfa and bromegrass. The sod is then torn with a field cultivator. The pastures are seeded around the first of May.

Inoculated legumes are desirable in mixtures used for seeding pastures. The well-drained loams or silt loams are seeded to mixtures that include common sweetclover, alfalfa, medium red clover, and bromegrass. On the wetter soils the seeding mixture consists of white clover, alsike clover, and reed canary grass. The native grasses replace the legumes as the legumes die out, but the legumes will give better yields of high-quality forage than the native grasses. The legumes should be allowed to reseed and to become well established, for they will help to retard the growth of the less desirable plants.

Livestock and Livestock Products

Livestock and livestock products are the major sources of income on the farms in Grant County. Hogs and dairy cattle are the most important of the animals raised. The number of livestock on farms in the county in 1940, 1950, and 1954 are shown in table 11.

TABLE 11.—*Number of livestock on farms*

Livestock	1940	1950	1954
	Number	*Number*	*Number*
Cattle and calves	[1] 96, 414	119, 934	137, 190
Hogs and pigs	[2] 70, 708	176, 504	230, 224
Horses and mules	[1] 16, 713	7, 152	3, 094
Sheep and lambs	[3] 18, 171	16, 959	18, 771
Chickens	[2] 395, 488	[2] 386, 020	[2] 446, 958

[1] More than 3 months old.
[2] More than 4 months old.
[3] More than 6 months old.

The principal breed of dairy cattle raised in the county is Holstein, but many cattle of Guernsey, Jersey, and Brown Swiss breeds are also raised. Whole milk and butter are the most important dairy products. In 1954, more than 280 million pounds of whole milk and more than 198 thousand pounds of butterfat were sold. In addition, some income was derived from the sale of calves and breeding stock.

Income from the sale of hogs and pigs was reported from about 85 percent of the farms in 1954. These animals accounted for about 39 percent of the farm income.

The number of horses and mules in this county has decreased considerably in the last few years. Sheep were raised on some farms, mostly in the hillier parts of the county. In 1954, sheep and lambs were reported on 575 farms.

Farm Tenure

Owners operated 55.8 percent of the farms in the county in 1954; tenants operated 32.4 percent; and part owners operated 11.5 percent. Only 11 farms were operated by managers.

The proportion of farms operated by tenants has decreased slightly in recent years. Sharecropping is the most common system of tenant farming. Under this rental agreement the owner provides the land and farm buildings and half the feed, seed, fertilizer, and livestock. The tenant provides the other half and labor and usually rents living quarters. There are many variations of this sharecropping agreement, depending mostly upon the desirability of the farm and upon the ability of the operator. Some of the farms are rented on a cash basis.

Farm Power and Mechanical Equipment

Horses and mules are no longer a major source of power on the farms in this county. Except on the smaller farms, they are used only for lighter work. In 1954, there were 5,565 tractors, 3,741 automobiles, and 2,458 trucks reported on the farms. In addition, there were 2,185 milking machines, 1,743 cornpickers, 1,044 pick-up hay balers, and 1,251 grain combines. Corn binders and ensilage cutters are commonly used in preparing corn for silage. Most farms have either a hay loader or other power equipment for making hay, or the farmer has access to such equipment.

Additional Facts About the County

The settlement of Grant County is discussed in this section. Information is also given about the industries and the transportation and markets.

Settlement

Marquette and Joliet are believed to have been the first Europeans to visit this part of Wisconsin. These missionaries and explorers came through the Great Lakes to Green Bay in 1673, up the Fox River, and then portaged across to the Wisconsin River. In 1810, a fur trader by the name of Grant came to the area and carried on a

trading business with the Indians. Grant County, named for this man, was established in 1836.

Because of its rich deposits of lead, Grant County was one of the first areas in Wisconsin to be settled. The first settlements were established by people of English and Irish descent who came to mine lead. Most of the settlers came from Missouri, Kentucky, and Illinois by way of the Mississippi River.

The early settlers gave little thought to farming. The farms were mostly in wooded areas, and the products were grown mainly for home use. When trees were cut so that crops could be planted, they provided lumber for the homes and other buildings. In 1827, Col. Joseph Dickson interested others in farming by plowing 20 acres, planting it to corn, and harvesting a good crop. After this, the number of farms began to increase steadily. By 1870, there were 4,301 farms in the county—the largest number ever recorded.

Grant County had a population of 16,169 in 1850. By 1950, the population was 41,460. More than 78 per cent of the population then lived in rural areas, and farming was their main source of income. In 1950, Platteville and Lancaster, the two largest cities, had populations of 5,751 and 3,266, respectively. A number of smaller cities and villages are in the county.

Industries

About 100 industrial establishments are located in Grant County. Most of these are food-processing plants, of which milk-processing plants are the most important. The rest are plants where furniture or other wood products are manufactured or finished, printing and publishing concerns, plants where products of iron and steel are manufactured, and chemical plants. The larger milk-processing plants are in the cities, but many small cheese factories are scattered throughout the county. The cheese factories provide ready markets for milk. Industries have had little effect upon the distribution of the population or upon the type of agriculture in the county.

Transportation and Markets

Most of the early transportation was by way of the Mississippi and Wisconsin Rivers. The Milwaukee and Mississippi Railroad reached Prairie du Chien in 1857. In 1867, this line was taken over by the Chicago, Milwaukee, and St. Paul Railroad. Railroads were soon built to Hazel Green, Cuba City, and Platteville, where considerable lead was being mined, and they still serve these areas.

The Chicago, Burlington and Quincy Railroad follows the Mississippi River from Prairie du Chien through Cassville to Dubuque, Iowa. The Chicago, Milwaukee, St. Paul and Pacific Railroad passes through Muscoda and follows the Wisconsin River to Prairie du Chien. Branches of the Chicago and North Western Railway Company serve Montfort, Fennimore, Lancaster, Platteville, and Cuba City.

United States Highway No. 61 runs from Boscobel through Fennimore and Lancaster and crosses the Mississippi River to Dubuque, Iowa. United States Highway No. 18 runs from Madison through the county by way of Montfort and Mount Hope to Bridgeport and thence to Prairie du Chien. State highways crisscross the county. In addition, there are many roads that are well maintained by the county or townships. More than 90 percent of the farms are within two-tenths of a mile of an all-weather road.

Most of the agricultural products are marketed locally. Some products, especially livestock, are shipped to Madison, Wis., and to Dubuque, Iowa. Processed products are sent to Chicago, Ill., to St. Louis, Mo., and to other markets.

Glossary (8)

Acidity. The degree of acidity of the soil mass expressed in pH values or in words as follows:

	pH		*pH*
Extremely acid	Below 4.5.	Mildly alkaline	7.4 to 7.8.
Very strongly acid	4.5 to 5.0.	Moderately aolkaline	7.9 to 8.4.
Strongly acid	5.1 to 5.5.	Strongly alkaline	8.5 to 9.0.
Medium acid	5.6 to 6.0.	Very strongly alkaline	9.1 and higher.
Slightly acid	6.1 to 6.5.		
Neutral[1]	6.6 to 7.3.		

[1] Where significant, the terms "very slightly acid" and "very mildly alkaline" may be used for soils of pH 6.6 to 6.9 and 7.1 to 7.3, respectively.

Alluvial soil. A soil that has formed in recently deposited stream sediments, generally on a flood plain.

Alluvium. Soil or rock material, as gravel, sand, silt, or clay, deposited on land by streams.

Blowout. An area from which all of the soil material has been removed by wind, leaving a depression in which the raw parent material is exposed.

Bottom land. Land that occurs along streams and is subject to periodic overflow.

Clay. Small mineral soil grains less than 0.002 millimeter (0.000079 inch) in diameter.

Colluvium. Rock fragments and soil materials accumulated at the bases of slopes through the combined action of gravity and water.

Consistence. The feel of the soil and the ease with which a lump is crushed by the fingers. Terms commonly used to describe consistence of the soil are as follows:

Loose. Noncoherent.

Friable. When moist, crushes easily under moderate pressure between thumb and forefinger and coheres when pressed together.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure, but cohesive; wire formable.

Sticky. When wet, adheres to other material; usually very cohesive when dry.

Hard. When dry, moderately resistant to pressure; barely breakable between thumb and forefinger.

Cemented. Hard and brittle and little affected by moistening.

Concave slope. A slope that is shaped like a bowl.

Convex slope. A slope that is bowed out.

Depressions. Low-lying areas that have no surface outlets for water that accumulates on them or that have only poor outlets.

Dunes. A mound or ridge of loose sand built up by the wind.

Escarpments. A long, steep ridge of land or rock that resembles a cliff. It faces in one general direction and separates two areas of more nearly level land.

Foot slopes. Gently sloping areas at the bases of higher hills or steeper slopes.

Franconia formation. Cambrian sandstone with layers of greenish-colored shale interbedded with sandstone and siltstone. Locally called glauconitic sandstone.

Horizon, soil. A layer of soil, nearly parallel to the soil surface, with distinct characteristics produced by soil-forming processes.

Lacustrine deposits. Materials laid down in lake waters.
Laminated. Thin, alternating layers of silt and clay laid down under water; commonly associated with lacustrine, or lake, sediments.
Loess. Fine-textured, mainly silty materials transported by wind and deposited on land.
Mottling. The discoloration common in soils in which drainage is restricted. These mottles appear as spots or streaks and vary in number and size.
Natural fertility. The inherent quality of a soil as measured by the quantity of compounds provided for proper, or balanced, growth of plants.
Nutrients, plant. Any element taken in by a plant, essential to its growth, and used by it in elaboration of its food and tissue.
Outwash. Sediments deposited in layers on terraces by water; in many places the sediments are sandy and gravelly.
Parent material. The unconsolidated material or decomposed bedrock from which the soil profile develops.
Ped. An individual natural soil aggregate, as a crumb, prism, or block, in contrast to a clod or other soil mass caused by digging or other disturbance.
Percent slope. The slant or gradient of a slope stated in percent; for example, a 10 percent slope is one that changes 10 feet in elevation for each 100 feet horizontal distance.
Permeability. The quality of a soil that enables it to transmit water or air.
Profile. A vertical section of the soil through all its horizons and extending into the parent material.
Renovation. Method of restoring a field used for pasture or hay to higher productivity by cultivating carefully so that the tillage will not cause erosion. The soil is then limed, fertilized, and reseeded with suitable grass-legume mixtures.
Sand. Soil particles of rock or minerals ranging in diameter from 0.05 millimeter (0.002 inch) to 2.0 millimeters (0.038 inch); also a soil that has 90 percent or more sand-size particles. The particles are larger than those of silt or clay.
Silt. Small mineral soil grains range in size from 0.05 millimeter (0.002 inch) to 0.002 millimeter (0.000079 inch) in diameter. The particles are smaller than sand but larger than clay.
Solum. The vertical cross section of a soil from the surface soil down to the end of the weathering zone.
Stratified. Layers of sandy or sandy and gravelly materials laid down by running water on stream terraces.
Structure, soil. The arrangement of the soil particles into lumps, granules, or other aggregates. Structure is described by grade (weak, moderate, or strong), that is, the distinctness and durability of the aggregates; by the size of the aggregates (very fine, fine, medium, coarse, or very coarse); and by their shape (platy, prismatic, columnar, blocky, granular, or crumb). A soil is described as structureless if there are no observable aggregates. Structureless soils may be massive (coherent) or single grain (noncoherent).
Blocky, angular. Aggregates are block shaped; they may have flat or rounded surfaces, which join at sharp angles.
Blocky, subangular. Aggregates have some rounded and some plane surfaces; vertices are rounded.
Columnar. Aggregates are prismatic and are rounded at the upper ends.
Crumb. Generally, soft, small, porous aggregates; irregular, but tending toward a spherical shape, as in the A_1 horizon of many soils. Crumb structure is closely related to granular structure.
Granular. Roughly spherical, firm, small aggregates that may be either hard or soft but that are generally firmer than crumb and without the distinct faces of blocky structure.
Platy. Soil particles are arranged around a plane that normally is horizontal.
Prismatic. Soil particles are arranged around a vertical line; aggregates have flat vertical surfaces.
Subsoil. Technically, the B horizon. Roughly, that part of the profile that is below plow depth.
Substratum. Material underlying the subsoil. It is below the zone of weathering.
Surface soil. The A horizon, or commonly, the upper part of the profile, or surface layer, that is stirred by plowing.
Terrace, stream. Areas that lie above the present flood plain; they are generally underlain by stratified stream sediments.
Tilth. The condition of a soil in respect to its fitness for growing a specified plant or sequence of plants.
Topography. The lay of the land or the elevations or inequalities of the land surface as shown on a topographic map.
Upland. Land that lies above the stream terraces and that is underlain by weathered bedrock at depths of 10 feet or less.
Vesicular. Small openings or pores in structural aggregates of soil horizons.

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GUIDE TO MAPPING UNITS [1]

Symbol	Soil	Page	Capability unit	Page
An	Alluvial land	12	Vw-1	54
Ar	Arenzville silt loam	12	IIw-11	50
AtA	Atterberry silt loam, 0 to 2 percent slopes	13	IIw-1	49
AtB	Atterberry silt loam, 2 to 6 percent slopes	13	IIw-1	49
AwC2	Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded.	13	IIIe-1	50
BtA	Bertrand silt loam, 0 to 2 percent slopes	14	I-1	48
BtB	Bertrand silt loam, 2 to 6 percent slopes	14	IIe-1	49
BtB2	Bertrand silt loam, 2 to 6 percent slopes, moderately eroded	14	IIe-1	49
BtC	Bertrand silt loam, 6 to 10 percent slopes	14	IIIe-1	50
BtC2	Bertrand silt loam, 6 to 10 percent slopes, moderately eroded	14	IIIe-1	50
BtD2	Bertrand silt loam, 10 to 15 percent slopes, moderately eroded	14	IIIe-1	50
ChA	Chaseburg silt loam, 0 to 3 percent slopes	14	IIw-11	50
ChB	Chaseburg silt loam, 3 to 6 percent slopes	15	IIw-11	50
ChC	Chaseburg silt loam, 6 to 15 percent slopes	15	IIIe-1	50
CsB2	Chelsea fine sand, 0 to 6 percent slopes, eroded	15	VIIs-1	55
CsC2	Chelsea fine sand, 6 to 10 percent slopes, eroded	15	VIIs-1	55
CsD2	Chelsea fine sand, 10 to 15 percent slopes, eroded	15	VIIs-1	55
Cu	Curran silt loam	16	IIw-1	49
DaA	Dakota fine sandy loam, 0 to 2 percent slopes	16	IIIs-2	52
DaB	Dakota fine sandy loam, 2 to 6 percent slopes	16	IIIs-2	52
DaC2	Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded	16	IVs-2	53
DbC2	Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded	17	IIIe-2	51
DbD2	Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded	17	IIIe-2	51
DbE2	Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded	17	IVe-2	52
DbF2	Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded	17	VIe-1	54
DcB2	Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded	17	IIe-1	49
DcC	Dodgeville silt loam, deep, 6 to 10 percent slopes	18	IIIe-1	50
DcC2	Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded	18	IIIe-1	50
DcD2	Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded	18	IIIe-1	50
DcE	Dodgeville silt loam, deep, 15 to 20 percent slopes	18	IVe-1	52
DdC3	Dodgeville soils, 6 to 10 percent slopes, severely eroded	18	IVe-2	53
DdD3	Dodgeville soils, 10 to 15 percent slopes, severely eroded	18	IVe-2	53
DeB3	Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded	18	IIIe-1	50
DeC3	Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded	18	IVe-1	52
DeD3	Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded	18	IVe-1	52
DoB2	Downs silt loam, 2 to 6 percent slopes, moderately eroded	19	IIe-1	49
DoB3	Downs silt loam, 2 to 6 percent slopes, severely eroded	19	IIIe-1	50
DoC	Downs silt loam, 6 to 10 percent slopes	19	IIIe-1	50
DoC2	Downs silt loam, 6 to 10 percent slopes, moderately eroded	19	IIIe-1	50
DoD2	Downs silt loam, 10 to 15 percent slopes, moderately eroded	19	IIIe-1	50
DoD3	Downs silt loam, 10 to 15 percent slopes, severely eroded	19	IVe-1	52
DsB	Dubuque silt loam, 2 to 6 percent slopes	20	IIe-2	49
DsB2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded	20	IIe-2	49
DsC	Dubuque silt loam, 6 to 10 percent slopes	20	IIIe-2	51
DsC2	Dubuque silt loam, 6 to 10 percent slopes, moderately eroded	20	IIIe-2	51
DsD	Dubuque silt loam, 10 to 15 percent slopes	20	IIIe-2	51
DsD2	Dubuque silt loam, 10 to 15 percent slopes, moderately eroded	20	IIIe-2	51
DsE	Dubuque silt loam, 15 to 20 percent slopes	21	IVe-2	53
DsE2	Dubuque silt loam, 15 to 20 percent slopes, moderately eroded	21	IVe-2	53
DsF	Dubuque silt loam, 20 to 30 percent slopes	21	VIe-1	54
DsF2	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded	21	VIe-1	54
DsG	Dubuque silt loam, 30 to 45 percent slopes	21	VIIe-1	55
DtB	Dubuque silt loam, deep, 2 to 6 percent slopes	21	IIe-1	49
DtB2	Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded	21	IIe-1	49
DtC	Dubuque silt loam, deep, 6 to 10 percent slopes	21	IIIe-1	50
DtC2	Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded	21	IIIe-1	50
DtD	Dubuque silt loam, deep, 10 to 15 percent slopes	22	IIIe-1	50
DtD2	Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded	22	IIIe-1	50
DtE	Dubuque silt loam, deep, 15 to 20 percent slopes	22	IVe-1	52
DtE2	Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded	22	IVe-1	52
DtF	Dubuque silt loam, deep, 20 to 30 percent slopes	22	VIe-1	54
DtF2	Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded	22	VIe-1	54
DtG	Dubuque silt loam, deep, 30 to 45 percent slopes	22	VIIe-1	55
DtG2	Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded	22	VIIe-1	55
DuC3	Dubuque soils, 6 to 10 percent slopes, severely eroded	22	IVe-2	53
DuD3	Dubuque soils, 10 to 15 percent slopes, severely eroded	22	IVe-2	53
DuE3	Dubuque soils, 15 to 20 percent slopes, severely eroded	22	VIe-1	54
DuF3	Dubuque soils, 20 to 30 percent slopes, severely eroded	23	VIIe-1	55
DvB3	Dubuque soils, deep, 2 to 6 percent slopes, severely eroded	23	IIIe-1	50
DvC3	Dubuque soils, deep, 6 to 10 percent slopes, severely eroded	23	IVe-1	52
DvD3	Dubuque soils, deep, 10 to 15 percent slopes, severely eroded	23	IVe-1	52

[1] Table 2, p. 9, shows the acreage and proportionate extent of the soils, and table 3, p. 56, gives estimated crop yields. To find the engineering properties of the soils, see section beginning on p. 62.

GUIDE TO MAPPING UNITS [1]—Continued

Symbol	*Soil*	*Page*	*Capability unit*	*Page*
DvE3	Dubuque soils, deep, 15 to 20 percent slopes, severely eroded	23	VIe-1	54
DvF3	Dubuque soils, deep, 20 to 30 percent slopes, severely eroded	23	VIIe-1	55
DyD	Dubuque stony silt loam, 10 to 15 percent slopes	23	IIIe-2	51
DyD2	Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded	23	IIIe-2	51
DyE2	Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded	23	IVe-2	53
DyF	Dubuque stony silt loam, 20 to 30 percent slopes	24	VIe-1	54
DyF2	Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded	24	VIe-1	54
DyG	Dubuque stony silt loam, 30 to 45 percent slopes	24	VIIe-1	55
FaB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded	24	IIe-1	49
FaB3	Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded	24	IIIe-1	50
FaC	Fayette silt loam, uplands, 6 to 10 percent slopes	25	IIIe-1	50
FaC2	Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded	25	IIIe-1	50
FaC3	Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded	25	IVe-1	52
FaD	Fayette silt loam, uplands, 10 to 15 percent slopes	25	IIIe-1	50
FaD2	Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded	25	IIIe-1	50
FaD3	Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded	25	IVe-1	52
FaE	Fayette silt loam, uplands 15 to 20 percent slopes	25	IVe-1	52
FaE2	Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded	25	IVe-1	52
FaE3	Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded	25	VIe-1	54
FaF	Fayette silt loam, uplands, 20 to 30 percent slopes	26	VIe-1	54
FaF2	Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded	26	VIe-1	54
FaF3	Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded	26	VIIe-1	55
FvC	Fayette silt loam, valleys, 6 to 10 percent slopes	26	IIIe-1	50
FvC2	Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded	26	IIIe-1	50
FvD	Fayette silt loam, valleys, 10 to 15 percent slopes	26	IIIe-1	50
FvD2	Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded	26	IIIe-1	50
FvE	Fayette silt loam, valleys, 15 to 20 percent slopes	27	IVe-1	52
FvE2	Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded	27	IVe-1	52
FvE3	Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded	27	VIe-1	54
FvF	Fayette silt loam, valleys, 20 to 30 percent slopes	27	VIe-1	54
FvF2	Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded	27	VIe-1	54
FvF3	Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded	27	VIIe-1	55
GaC	Gale silt loam, 2 to 10 percent slopes	27	IIe-2	49
GaC2	Gale silt loam, 2 to 10 percent slopes, moderately eroded	28	IIe-2	49
GaC3	Gale silt loam, 2 to 10 percent slopes, severely eroded	28	IIIe-2	51
GaD2	Gale silt loam, 10 to 15 percent slopes, moderately eroded	28	IVe-2	53
GaD3	Gale silt loam, 10 to 15 percent slopes, severely eroded	28	IVe-2	53
GaE2	Gale silt loam, 15 to 20 percent slopes, moderately eroded	28	IVe-2	53
GaE3	Gale silt loam, 15 to 20 percent slopes, severely eroded	28	VIe-1	54
GaF	Gale silt loam, 20 to 30 percent slopes	28	VIe-1	54
GaF2	Gale silt loam, 20 to 30 percent slopes, moderately eroded	28	VIe-1	54
Gw	Garwin silty clay loam	28	IIw-1	49
HcC2	Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded	29	IIIs-2	52
HcD2	Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded	29	IVs-2	53
HcD3	Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded	29	VIs-1	55
HcE	Hesch fine sandy loam, 15 to 20 percent slopes	30	VIs-1	55
HcE2	Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded	30	VIs-1	55
HcE3	Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded	30	VIIs-1	55
HcF	Hesch fine sandy loam, 20 to 45 percent slopes	30	VIIs-1	55
HcF2	Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded	30	VIIs-1	55
HeC2	Hesch loam, 2 to 10 percent slopes, moderately eroded	29	IIe-2	49
HeD2	Hesch loam, 10 to 15 percent slopes, moderately eroded	29	IIIe-2	51
HeE2	Hesch loam, 15 to 20 percent slopes, moderately eroded	29	IVe-2	53
HfB2	Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded	31	IIIs-2	52
HfC2	Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded	31	IVs-2	53
HfD	Hixton fine sandy loam, 10 to 15 percent slopes	31	IVs-2	53
HfD2	Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded	31	IVs-2	53
HfD3	Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded	32	VIs-1	55
HfE	Hixton fine sandy loam, 15 to 20 percent slopes	32	VIs-1	55
HfE2	Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded	32	VIs-1	55
HfE3	Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded	32	VIIs-1	55
HfF	Hixton fine sandy loam, 20 to 30 percent slopes	32	VIIs-1	55
HfF2	Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded	32	VIIs-1	55
HfF3	Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded	32	VIIs-1	55
HfG	Hixton fine sandy loam, 30 to 45 percent slopes	32	VIIs-1	55
HfG2	Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded	32	VIIs-1	55
HxC	Hixton loam, 2 to 10 percent slopes	30	IIe-2	49
HxC2	Hixton loam, 2 to 10 percent slopes, moderately eroded	30	IIe-2	49
HxD2	Hixton loam, 10 to 15 percent slopes, moderately eroded	30	IIIe-2	51
HxD3	Hixton loam, 10 to 15 percent slopes, severely eroded	31	IVe-2	53
HxE2	Hixton loam, 15 to 20 percent slopes, moderately eroded	31	IVe-2	53
HxE3	Hixton loam, 15 to 20 percent slopes, severely eroded	31	VIe-1	54
HxF	Hixton loam, 20 to 30 percent slopes	31	VIe-1	54
HxF2	Hixton loam, 20 to 30 percent slopes, moderately eroded	31	VIe-1	54
JaA	Jackson silt loam, 0 to 2 percent slopes	32	I-1	48

GUIDE TO MAPPING UNITS [1]—Continued

Symbol	*Soil*	*Page*	*Capability unit*	*Page*
JaB	Jackson silt loam, 2 to 6 percent slopes	33	IIe–1	49
JaB2	Jackson silt loam, 2 to 6 percent slopes, moderately eroded	33	IIe–1	49
JaC2	Jackson silt loam, 6 to 10 percent slopes, moderately eroded	33	IIIe–1	50
JuA	Judson silt loam, 0 to 3 percent slopes	33	IIw–11	50
JuB	Judson silt loam, 3 to 10 percent slopes	33	IIw–11	50
LaB2	Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded	34	IIIs–2	52
LaD2	Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded	34	IVe–7	53
LaD3	Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded	34	IVe–7	53
LaE	Lamont fine sandy loam, 15 to 20 percent slopes	34	IVe–7	53
LaE2	Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded	34	IVe–7	53
LaF	Lamont fine sandy loam, 20 to 45 percent slopes	34	VIs–1	55
LaF2	Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded	34	VIs–1	55
LnC2	Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded	35	IIIe–1	50
LnE2	Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded	35	IVe–1	52
Ma	Marsh	35	VIIIw–1	56
MdA	Medary silt loam, 0 to 2 percent slopes	35	IIe–6	49
MdB2	Medary silt loam, 2 to 6 percent slopes, moderately eroded	36	IIe–6	49
MdC2	Medary silt loam, 6 to 10 percent slopes, moderately eroded	36	IIIe–1	50
MdD2	Medary silt loam, 10 to 15 percent slopes, moderately eroded	36	IIIe–1	50
MeC3	Medary soils, 6 to 10 percent slopes, severely eroded	36	IVe–1	52
MfA	Meridian fine sandy loam, 0 to 2 percent slopes	37	IIIs–2	52
MfB	Meridian fine sandy loam, 2 to 6 percent slopes	37	IIIs–2	52
MfB2	Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded	37	IIIs–2	52
MfC2	Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded	37	IVs–2	53
MfC3	Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded	37	VIs–1	55
MfD2	Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded	37	IVs–2	53
MmA	Meridian loam, 0 to 2 percent slopes	36	IIs–1	50
MmB	Meridian loam, 2 to 6 percent slopes	36	IIs–1	50
MmB2	Meridian loam, 2 to 6 percent slopes, moderately eroded	36	IIs–1	50
MmC2	Meridian loam, 6 to 10 percent slopes, moderately eroded	37	IIIs–2	52
MmD2	Meridian loam, 10 to 15 percent slopes, moderately eroded	37	IIIs–2	52
MuA	Muscatine silt loam, 0 to 2 percent slopes	38	I–1	48
MuB	Muscatine silt loam, 2 to 6 percent slopes	38	IIe–1	49
MuB2	Muscatine silt loam, 2 to 6 percent slopes, moderately eroded	38	IIe–1	49
Or	Orion silt loam	38	IIIw–14	52
RcA	Richwood silt loam, 0 to 2 percent slopes	38	I–1	48
RcB	Richwood silt loam, 2 to 6 percent slopes	39	IIe–1	49
RoC	Rozetta silt loam, 6 to 10 percent slopes	39	IIIe–1	50
RoC2	Rozetta silt loam, 6 to 10 percent slopes, moderately eroded	39	IIIe–1	50
SeB	Seaton silt loam, 2 to 6 percent slopes	40	IIe–1	49
SeB2	Seaton silt loam, 2 to 6 percent slopes, moderately eroded	40	IIe–1	49
SeC2	Seaton silt loam, 6 to 10 percent slopes, moderately eroded	40	IIIe–1	50
SeC3	Seaton silt loam, 6 to 10 percent slopes, severely eroded	40	IVe–1	52
SeD	Seaton silt loam, 10 to 15 percent slopes	40	IIIe–1	50
SeD2	Seaton silt loam, 10 to 15 percent slopes, moderately eroded	40	IIIe–1	50
SeD3	Seaton silt loam, 10 to 15 percent slopes, severely eroded	40	IVe–1	52
SeE	Seaton silt loam, 15 to 20 percent slopes	40	IVe–1	52
SeE2	Seaton silt loam, 15 to 20 percent slopes, moderately eroded	40	IVe–1	52
SeE3	Seaton silt loam, 15 to 20 percent slopes, severely eroded	40	VIe–1	54
SeF	Seaton silt loam, 20 to 45 percent slopes	41	VIe–1	54
SeF2	Seaton silt loam, 20 to 45 percent slopes, moderately eroded	41	VIe–1	54
SnD	Sogn loam, 10 to 15 percent slopes	41	VIe–1	54
SnD2	Sogn loam, 10 to 15 percent slopes, moderately eroded	41	VIe–1	54
SnE2	Sogn loam, 15 to 20 percent slopes, moderately eroded	41	VIIs–1	55
SoB2	Sogn silt loam, 2 to 10 percent slopes, moderately eroded	41	IVs–2	53
SoD	Sogn silt loam, 10 to 15 percent slopes	41	VIe–1	54
SoD2	Sogn silt loam, 10 to 15 percent slopes, moderately eroded	41	VIe–1	54
SoE	Sogn silt loam, 15 to 20 percent slopes	41	VIIs–1	55
SoE2	Sogn silt loam, 15 to 20 percent slopes, moderately eroded	41	VIIs–1	55
SpC	Sparta fine sand and Blown-out land, 6 to 15 percent slopes	43	VIIs–1	55
SrC	Sparta fine sand and Dune land, 6 to 15 percent slopes	42	VIIs–1	55
SsA	Sparta loamy fine sand, 0 to 2 percent slopes	42	IVs–3	54
SsA2	Sparta loamy fine sand, 0 to 2 percent slopes, eroded	42	IVs–3	54
SsB	Sparta loamy fine sand, 2 to 6 percent slopes	42	IVs–3	54
SsB2	Sparta loamy fine sand, 2 to 6 percent slopes, eroded	42	IVs–3	54
SsC	Sparta loamy fine sand, 6 to 15 percent slopes	42	VIIs–1	55
StA	Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes	42	IVs–3	54
Su	Stony colluvial land	43	VIs–1	55
Sv	Stony rock land, steep	43	VIs–1	55
Sw	Stony rock land, very steep	43	VIIs–1	55
SyB	Stronghurst silt loam, 2 to 6 percent slopes	43	IIw–1	49
SyB2	Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded	44	IIw–1	49
TaA	Tama silt loam, 0 to 2 percent slopes	44	I–1	48
TaB	Tama silt loam, 2 to 6 percent slopes	44	IIe–1	49
TaB2	Tama silt loam, 2 to 6 percent slopes, moderately eroded	44	IIe–1	49

GUIDE TO MAPPING UNITS [1]—Continued

Symbol	*Soil*	*Page*	*Capability unit*	*Page*
TaB3	Tama silt loam, 2 to 6 percent slopes, severely eroded	44	IIIe–1	50
TaC2	Tama silt loam, 6 to 10 percent slopes, moderately eroded	45	IIIe–1	50
TaC3	Tama silt loam, 6 to 10 percent slopes, severely eroded	45	IVe–1	52
TaD	Tama silt loam, 10 to 15 percent slopes	45	IIIe–1	50
TaD2	Tama silt loam, 10 to 15 percent slopes, moderately eroded	45	IIIe–1	50
TaD3	Tama silt loam, 10 to 15 percent slopes, severely eroded	45	IVe–1	52
Tc	Terrace escarpments, medium textured	45	VIe–1	54
Te	Terrace escarpments, coarse textured	45	VIIs–1	55
To	Toddville silt loam	46	I–1	48

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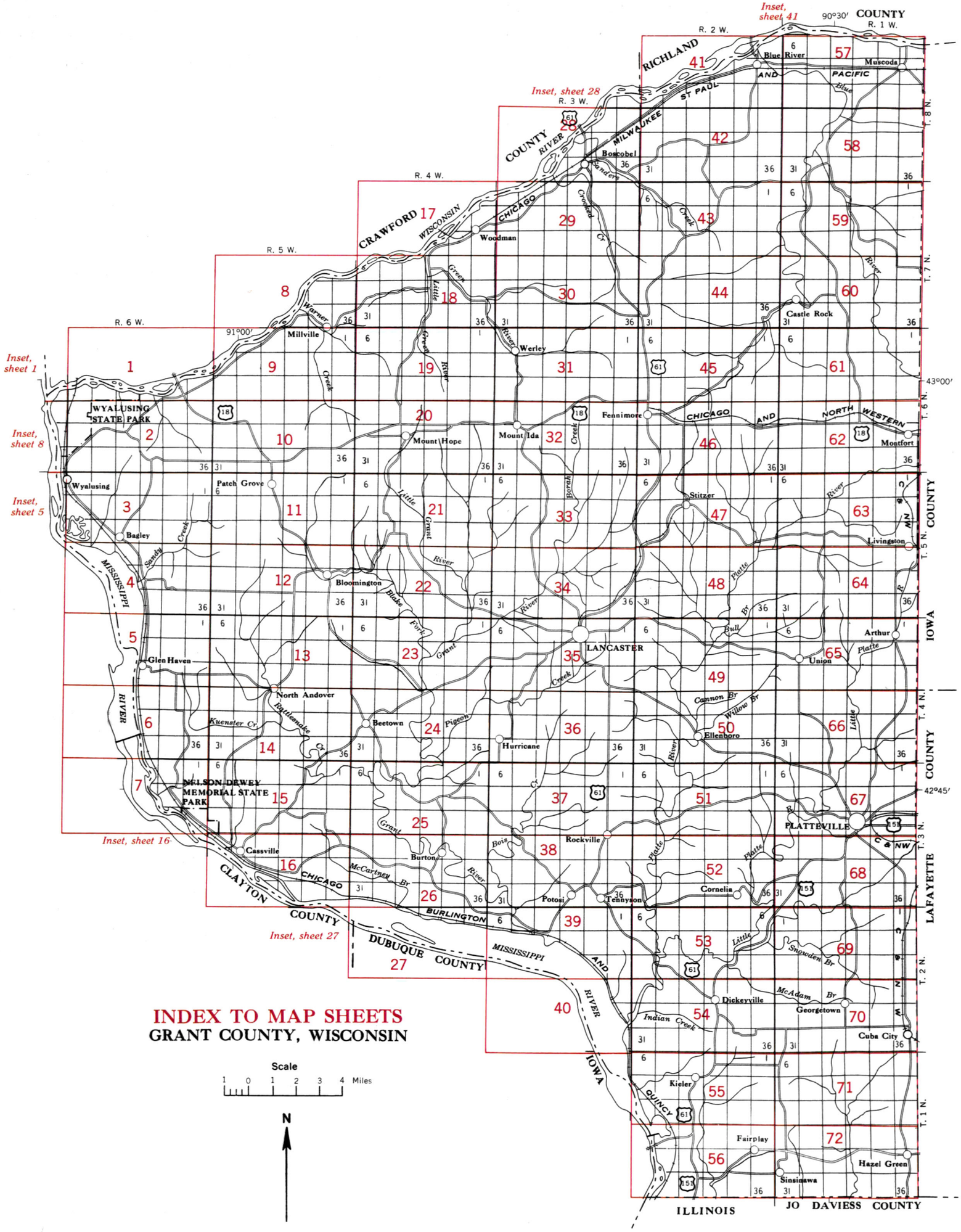

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Scale
1 0 1 2 3 4 Miles

N

GRANT COUNTY, WISCONSIN

SOIL LEGEND

The first letter in each soil symbol is the initial of the soil series name. If slope forms part of the soil name, a second capital letter shows the range of steepness. A number shows that the soil is eroded.

SYMBOL	NAME
An	Alluvial land
Ar	Arenzville silt loam
AtA	Atterberry silt loam, 0 to 2 percent slopes
AtB	Atterberry silt loam, 2 to 6 percent slopes
AwC2	Atterberry-Downs silt loams, 6 to 15 percent slopes, moderately eroded
BtA	Bertrand silt loam, 0 to 2 percent slopes
BtB	Bertrand silt loam, 2 to 6 percent slopes
BtB2	Bertrand silt loam, 2 to 6 percent slopes, moderately eroded
BtC	Bertrand silt loam, 6 to 10 percent slopes
BtC2	Bertrand silt loam, 6 to 10 percent slopes, moderately eroded
BtD2	Bertrand silt loam, 10 to 15 percent slopes, moderately eroded
ChA	Chaseburg silt loam, 0 to 3 percent slopes
ChB	Chaseburg silt loam, 3 to 6 percent slopes
ChC	Chaseburg silt loam, 6 to 15 percent slopes
CsB2	Chelsea fine sand, 0 to 6 percent slopes, eroded
CsC2	Chelsea fine sand, 6 to 10 percent slopes, eroded
CsD2	Chelsea fine sand, 10 to 15 percent slopes, eroded
Cu	Curran silt loam
DaA	Dakota fine sandy loam, 0 to 2 percent slopes
DaB	Dakota fine sandy loam, 2 to 6 percent slopes
DaC2	Dakota fine sandy loam, 6 to 10 percent slopes, moderately eroded
DbC2	Dodgeville silt loam, 6 to 10 percent slopes, moderately eroded
DbD2	Dodgeville silt loam, 10 to 15 percent slopes, moderately eroded
DbE2	Dodgeville silt loam, 15 to 20 percent slopes, moderately eroded
DbF2	Dodgeville silt loam, 20 to 30 percent slopes, moderately eroded
DcB2	Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded
DcC	Dodgeville silt loam, deep, 6 to 10 percent slopes
DcC2	Dodgeville silt loam, deep, 6 to 10 percent slopes, moderately eroded
DcD2	Dodgeville silt loam, deep, 10 to 15 percent slopes, moderately eroded
DcE	Dodgeville silt loam, deep, 15 to 20 percent slopes
DdC3	Dodgeville soils, 6 to 10 percent slopes, severely eroded
DdD3	Dodgeville soils, 10 to 15 percent slopes, severely eroded
DeB3	Dodgeville soils, deep, 2 to 6 percent slopes, severely eroded
DeC3	Dodgeville soils, deep, 6 to 10 percent slopes, severely eroded
DeD3	Dodgeville soils, deep, 10 to 15 percent slopes, severely eroded
DoB2	Downs silt loam, 2 to 6 percent slopes, moderately eroded
DoB3	Downs silt loam, 2 to 6 percent slopes, severely eroded
DoC	Downs silt loam, 6 to 10 percent slopes
DoC2	Downs silt loam, 6 to 10 percent slopes, moderately eroded
DoD2	Downs silt loam, 10 to 15 percent slopes, moderately eroded
DoD3	Downs silt loam, 10 to 15 percent slopes, severely eroded
DsB	Dubuque silt loam, 2 to 6 percent slopes
DsB2	Dubuque silt loam, 2 to 6 percent slopes, moderately eroded
DsC	Dubuque silt loam, 6 to 10 percent slopes
DsC2	Dubuque silt loam, 6 to 10 percent slopes, moderately eroded
DsD	Dubuque silt loam, 10 to 15 percent slopes
DsD2	Dubuque silt loam, 10 to 15 percent slopes, moderately eroded
DsE	Dubuque silt loam, 15 to 20 percent slopes
DsE2	Dubuque silt loam, 15 to 20 percent slopes, moderately eroded
DsF	Dubuque silt loam, 20 to 30 percent slopes
DsF2	Dubuque silt loam, 20 to 30 percent slopes, moderately eroded
DsG	Dubuque silt loam, 30 to 45 percent slopes
DtB	Dubuque silt loam, deep, 2 to 6 percent slopes
DtB2	Dubuque silt loam, deep, 2 to 6 percent slopes, moderately eroded
DtC	Dubuque silt loam, deep, 6 to 10 percent slopes
DtC2	Dubuque silt loam, deep, 6 to 10 percent slopes, moderately eroded
DtD	Dubuque silt loam, deep, 10 to 15 percent slopes
DtD2	Dubuque silt loam, deep, 10 to 15 percent slopes, moderately eroded
DtE	Dubuque silt loam, deep, 15 to 20 percent slopes
DtE2	Dubuque silt loam, deep, 15 to 20 percent slopes, moderately eroded
DtF	Dubuque silt loam, deep, 20 to 30 percent slopes
DtF2	Dubuque silt loam, deep, 20 to 30 percent slopes, moderately eroded
DtG	Dubuque silt loam, deep, 30 to 45 percent slopes
DtG2	Dubuque silt loam, deep, 30 to 45 percent slopes, moderately eroded
DuC3	Dubuque soils, 6 to 10 percent slopes, severely eroded
DuD3	Dubuque soils, 10 to 15 percent slopes, severely eroded
DuE3	Dubuque soils, 15 to 20 percent slopes, severely eroded
DuF3	Dubuque soils, 20 to 30 percent slopes, severely eroded
DvB3	Dubuque soils, deep, 2 to 6 percent slopes, severely eroded
DvC3	Dubuque soils, deep, 6 to 10 percent slopes, severely eroded
DvD3	Dubuque soils, deep, 10 to 15 percent slopes, severely eroded
DvE3	Dubuque soils, deep, 15 to 20 percent slopes, severely eroded
DvF3	Dubuque soils, deep, 20 to 30 percent slopes, severely eroded
DyD	Dubuque stony silt loam, 10 to 15 percent slopes
DyD2	Dubuque stony silt loam, 10 to 15 percent slopes, moderately eroded
DyE2	Dubuque stony silt loam, 15 to 20 percent slopes, moderately eroded
DyF	Dubuque stony silt loam, 20 to 30 percent slopes
DyF2	Dubuque stony silt loam, 20 to 30 percent slopes, moderately eroded
DyG	Dubuque stony silt loam, 30 to 45 percent slopes
FaB2	Fayette silt loam, uplands, 2 to 6 percent slopes, moderately eroded
FaB3	Fayette silt loam, uplands, 2 to 6 percent slopes, severely eroded
FaC	Fayette silt loam, uplands, 6 to 10 percent slopes
FaC2	Fayette silt loam, uplands, 6 to 10 percent slopes, moderately eroded
FaC3	Fayette silt loam, uplands, 6 to 10 percent slopes, severely eroded
FaD	Fayette silt loam, uplands, 10 to 15 percent slopes
FaD2	Fayette silt loam, uplands, 10 to 15 percent slopes, moderately eroded
FaD3	Fayette silt loam, uplands, 10 to 15 percent slopes, severely eroded
FaE	Fayette silt loam, uplands, 15 to 20 percent slopes
FaE2	Fayette silt loam, uplands, 15 to 20 percent slopes, moderately eroded
FaE3	Fayette silt loam, uplands, 15 to 20 percent slopes, severely eroded
FaF	Fayette silt loam, uplands, 20 to 30 percent slopes
FaF2	Fayette silt loam, uplands, 20 to 30 percent slopes, moderately eroded
FaF3	Fayette silt loam, uplands, 20 to 30 percent slopes, severely eroded
FvC	Fayette silt loam, valleys, 6 to 10 percent slopes
FvC2	Fayette silt loam, valleys, 6 to 10 percent slopes, moderately eroded
FvD	Fayette silt loam, valleys, 10 to 15 percent slopes
FvD2	Fayette silt loam, valleys, 10 to 15 percent slopes, moderately eroded
FvE	Fayette silt loam, valleys, 15 to 20 percent slopes
FvE2	Fayette silt loam, valleys, 15 to 20 percent slopes, moderately eroded
FvE3	Fayette silt loam, valleys, 15 to 20 percent slopes, severely eroded
FvF	Fayette silt loam, valleys, 20 to 30 percent slopes
FvF2	Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded
FvF3	Fayette silt loam, valleys, 20 to 30 percent slopes, severely eroded
GaC	Gale silt loam, 2 to 10 percent slopes
GaC2	Gale silt loam, 2 to 10 percent slopes, moderately eroded
GaC3	Gale silt loam, 2 to 10 percent slopes, severely eroded
GaD2	Gale silt loam, 10 to 15 percent slopes, moderately eroded
GaD3	Gale silt loam, 10 to 15 percent slopes, severely eroded
GaE2	Gale silt loam, 15 to 20 percent slopes, moderately eroded
GaE3	Gale silt loam, 15 to 20 percent slopes, severely eroded
GaF	Gale silt loam, 20 to 30 percent slopes
GaF2	Gale silt loam, 20 to 30 percent slopes, moderately eroded
Gw	Garwin silty clay loam
HcC2	Hesch fine sandy loam, 2 to 10 percent slopes, moderately eroded
HcD2	Hesch fine sandy loam, 10 to 15 percent slopes, moderately eroded
HcD3	Hesch fine sandy loam, 10 to 15 percent slopes, severely eroded
HcE	Hesch fine sandy loam, 15 to 20 percent slopes
HcE2	Hesch fine sandy loam, 15 to 20 percent slopes, moderately eroded
HcE3	Hesch fine sandy loam, 15 to 20 percent slopes, severely eroded
HcF	Hesch fine sandy loam, 20 to 45 percent slopes
HcF2	Hesch fine sandy loam, 20 to 45 percent slopes, moderately eroded
HeC2	Hesch loam, 2 to 10 percent slopes, moderately eroded
HeD2	Hesch loam, 10 to 15 percent slopes, moderately eroded
HeE2	Hesch loam, 15 to 20 percent slopes, moderately eroded
HfB2	Hixton fine sandy loam, 2 to 6 percent slopes, moderately eroded
HfC2	Hixton fine sandy loam, 6 to 10 percent slopes, moderately eroded
HfD	Hixton fine sandy loam, 10 to 15 percent slopes
HfD2	Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded
HfD3	Hixton fine sandy loam, 10 to 15 percent slopes, severely eroded
HfE	Hixton fine sandy loam, 15 to 20 percent slopes
HfE2	Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded
HfE3	Hixton fine sandy loam, 15 to 20 percent slopes, severely eroded
HfF	Hixton fine sandy loam, 20 to 30 percent slopes
HfF2	Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded
HfF3	Hixton fine sandy loam, 20 to 30 percent slopes, severely eroded
HfG	Hixton fine sandy loam, 30 to 45 percent slopes
HfG2	Hixton fine sandy loam, 30 to 45 percent slopes, moderately eroded
HxC	Hixton loam, 2 to 10 percent slopes
HxC2	Hixton loam, 2 to 10 percent slopes, moderately eroded
HxD2	Hixton loam, 10 to 15 percent slopes, moderately eroded
HxD3	Hixton loam, 10 to 15 percent slopes, severely eroded
HxE2	Hixton loam, 15 to 20 percent slopes, moderately eroded
HxE3	Hixton loam, 15 to 20 percent slopes, severely eroded
HxF	Hixton loam, 20 to 30 percent slopes
HxF2	Hixton loam, 20 to 30 percent slopes, moderately eroded
JaA	Jackson silt loam, 0 to 2 percent slopes
JaB	Jackson silt loam, 2 to 6 percent slopes
JaB2	Jackson silt loam, 2 to 6 percent slopes, moderately eroded
JaC2	Jackson silt loam, 6 to 10 percent slopes, moderately eroded
JuA	Judson silt loam, 0 to 3 percent slopes
JuB	Judson silt loam, 3 to 10 percent slopes
LaB2	Lamont fine sandy loam, 0 to 10 percent slopes, moderately eroded
LaD2	Lamont fine sandy loam, 10 to 15 percent slopes, moderately eroded
LaD3	Lamont fine sandy loam, 10 to 15 percent slopes, severely eroded
LaE	Lamont fine sandy loam, 15 to 20 percent slopes
LaE2	Lamont fine sandy loam, 15 to 20 percent slopes, moderately eroded
LaF	Lamont fine sandy loam, 20 to 45 percent slopes
LaF2	Lamont fine sandy loam, 20 to 45 percent slopes, moderately eroded
LnC2	Lindstrom silt loam, 6 to 15 percent slopes, moderately eroded
LnE2	Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded
Ma	Marsh
MdA	Medary silt loam, 0 to 2 percent slopes
MdB2	Medary silt loam, 2 to 6 percent slopes, moderately eroded
MdC2	Medary silt loam, 6 to 10 percent slopes, moderately eroded
MdD2	Medary silt loam, 10 to 15 percent slopes, moderately eroded
MeC3	Medary soils, 6 to 10 percent slopes, severely eroded
MfA	Meridian fine sandy loam, 0 to 2 percent slopes
MfB	Meridian fine sandy loam, 2 to 6 percent slopes
MfB2	Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded
MfC2	Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded
MfC3	Meridian fine sandy loam, 6 to 10 percent slopes, severely eroded
MfD2	Meridian fine sandy loam, 10 to 15 percent slopes, moderately eroded
MmA	Meridian loam, 0 to 2 percent slopes
MmB	Meridian loam, 2 to 6 percent slopes
MmB2	Meridian loam, 2 to 6 percent slopes, moderately eroded
MmC2	Meridian loam, 6 to 10 percent slopes, moderately eroded
MmD2	Meridian loam, 10 to 15 percent slopes, moderately eroded
MuA	Muscatine silt loam, 0 to 2 percent slopes
MuB	Muscatine silt loam, 2 to 6 percent slopes
MuB2	Muscatine silt loam, 2 to 6 percent slopes, moderately eroded
Or	Orion silt loam
RcA	Richwood silt loam, 0 to 2 percent slopes
RcB	Richwood silt loam, 2 to 6 percent slopes
RoC	Rozetta silt loam, 6 to 10 percent slopes
RoC2	Rozetta silt loam, 6 to 10 percent slopes, moderately eroded
SeB	Seaton silt loam, 2 to 6 percent slopes
SeB2	Seaton silt loam, 2 to 6 percent slopes, moderately eroded
SeC2	Seaton silt loam, 6 to 10 percent slopes, moderately eroded
SeC3	Seaton silt loam, 6 to 10 percent slopes, severely eroded
SeD	Seaton silt loam, 10 to 15 percent slopes
SeD2	Seaton silt loam, 10 to 15 percent slopes, moderately eroded
SeD3	Seaton silt loam, 10 to 15 percent slopes, severely eroded
SeE	Seaton silt loam, 15 to 20 percent slopes
SeE2	Seaton silt loam, 15 to 20 percent slopes, moderately eroded
SeE3	Seaton silt loam, 15 to 20 percent slopes, severely eroded
SeF	Seaton silt loam, 20 to 45 percent slopes
SeF2	Seaton silt loam, 20 to 45 percent slopes, moderately eroded
SnD	Sogn loam, 10 to 15 percent slopes
SnD2	Sogn loam, 10 to 15 percent slopes, moderately eroded
SnE2	Sogn loam, 15 to 20 percent slopes, moderately eroded
SoB2	Sogn silt loam, 2 to 10 percent slopes, moderately eroded
SoD	Sogn silt loam, 10 to 15 percent slopes
SoD2	Sogn silt loam, 10 to 15 percent slopes, moderately eroded
SoE	Sogn silt loam, 15 to 20 percent slopes
SoE2	Sogn silt loam, 15 to 20 percent slopes, moderately eroded
SpC	Sparta fine sand and Blown-out land, 6 to 15 percent slopes
SrC	Sparta fine sand and Dune land, 6 to 15 percent slopes
SsA	Sparta loamy fine sand, 0 to 2 percent slopes
SsA2	Sparta loamy fine sand, 0 to 2 percent slopes, eroded
SsB	Sparta loamy fine sand, 2 to 6 percent slopes
SsB2	Sparta loamy fine sand, 2 to 6 percent slopes, eroded
SsC	Sparta loamy fine sand, 6 to 15 percent slopes
StA	Sparta loamy fine sand and Blown-out land, 0 to 2 percent slopes
Su	Stony colluvial land
Sv	Stony rock land, steep
Sw	Stony rock land, very steep
SyB	Stronghurst silt loam, 2 to 6 percent slopes
SyB2	Stronghurst silt loam, 2 to 6 percent slopes, moderately eroded
TaA	Tama silt loam, 0 to 2 percent slopes
TaB	Tama silt loam, 2 to 6 percent slopes
TaB2	Tama silt loam, 2 to 6 percent slopes, moderately eroded
TaB3	Tama silt loam, 2 to 6 percent slopes, severely eroded
TaC2	Tama silt loam, 6 to 10 percent slopes, moderately eroded
TaC3	Tama silt loam, 6 to 10 percent slopes, severely eroded
TaD	Tama silt loam, 10 to 15 percent slopes
TaD2	Tama silt loam, 10 to 15 percent slopes, moderately eroded
TaD3	Tama silt loam, 10 to 15 percent slopes, severely eroded
Tc	Terrace escarpments, medium textured
Te	Terrace escarpments, coarse textured
To	Toddville silt loam

Soil map constructed 1959 by Cartographic Division, Soil Conservation Service, USDA, from 1955 aerial photographs. Controlled mosaic based on Wisconsin plane coordinate system, south zone, Lambert conformal conic projection, 1927 North American datum.

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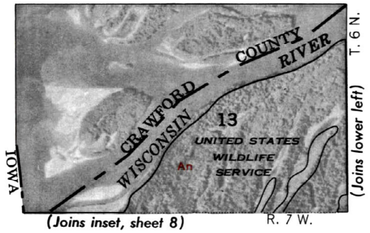
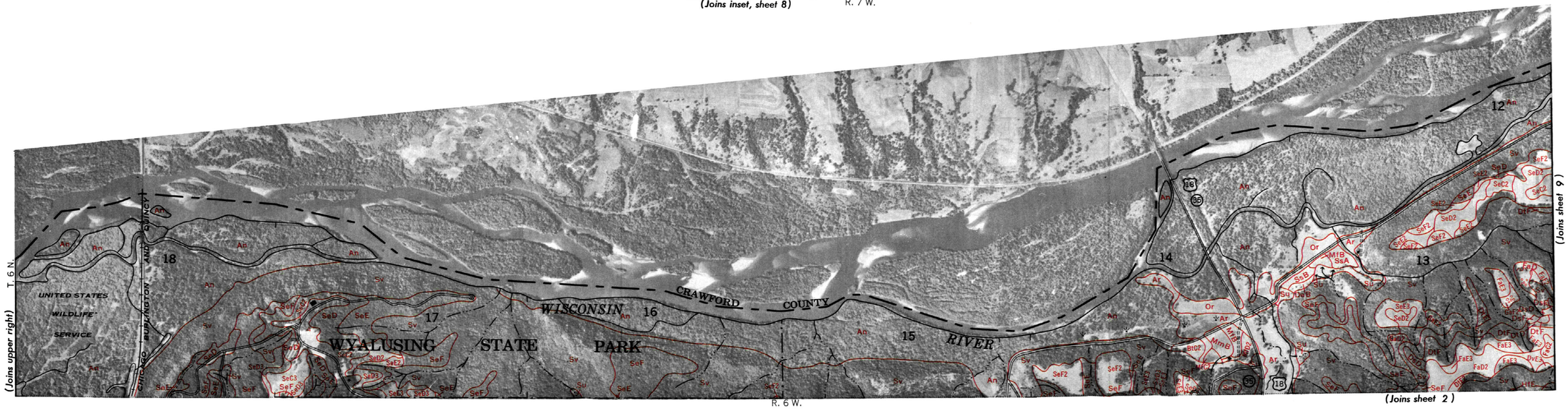
N





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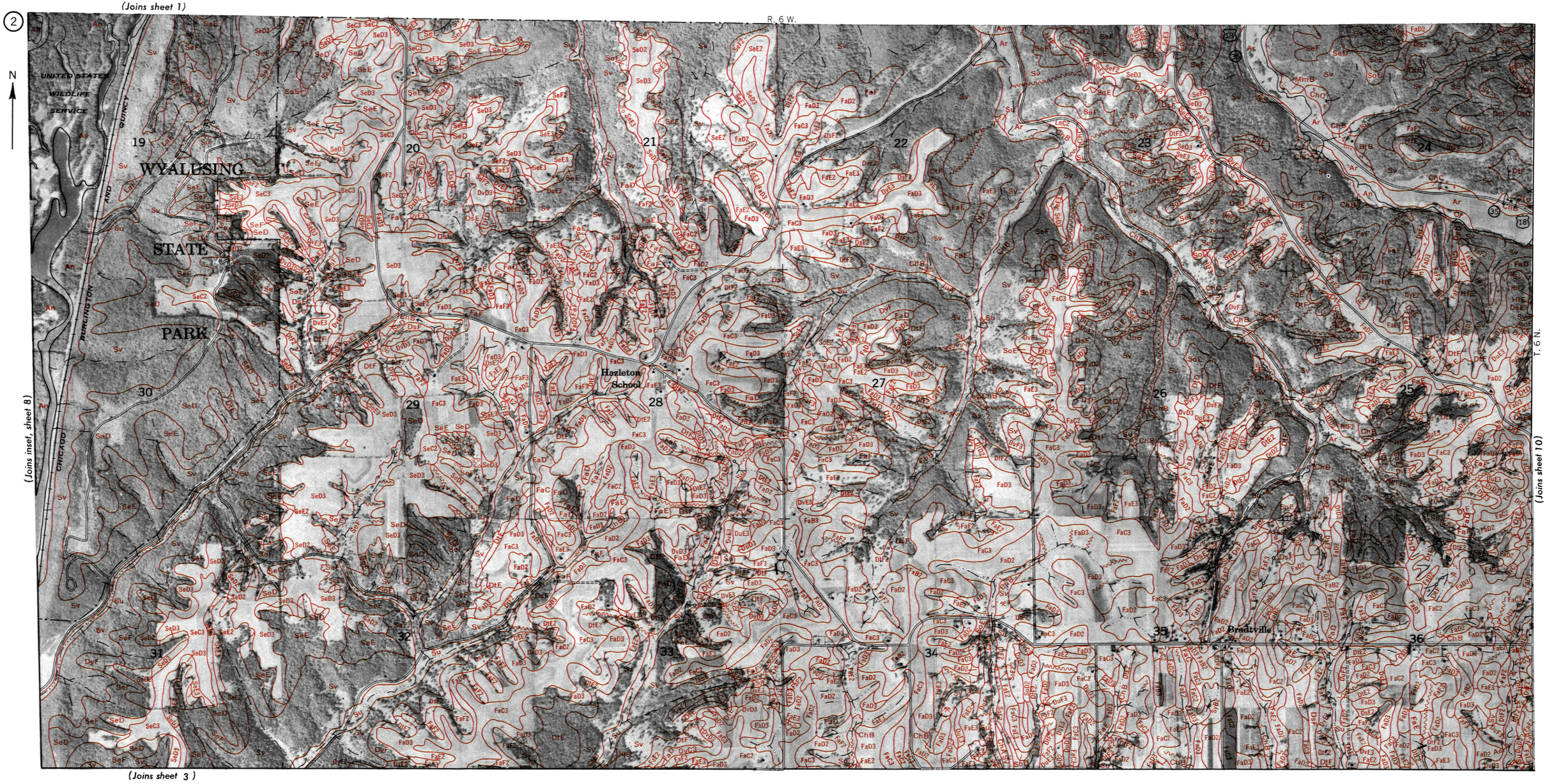
GRANT COUNTY, WISCONSIN—SHEET NUMBER 2



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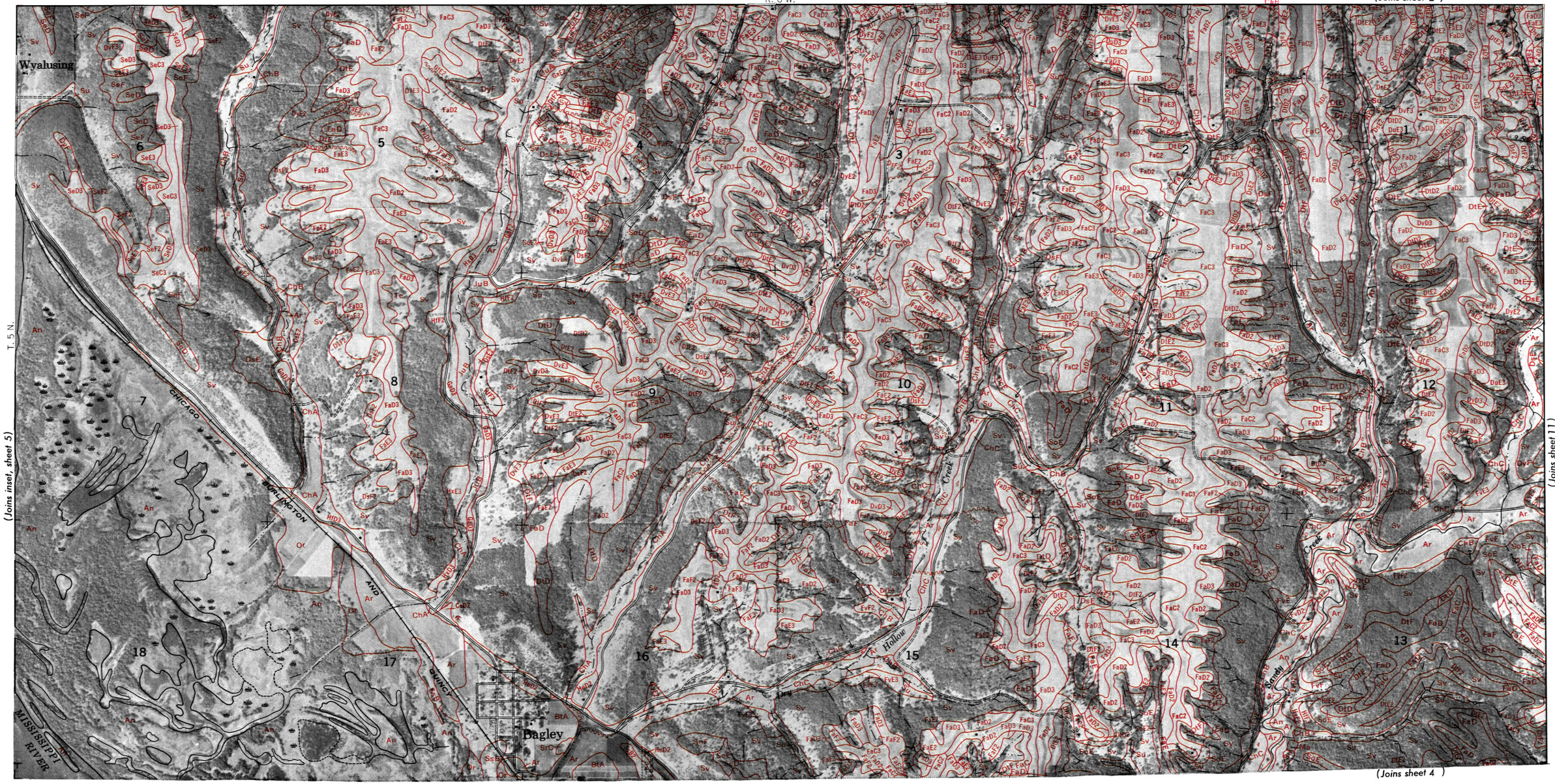

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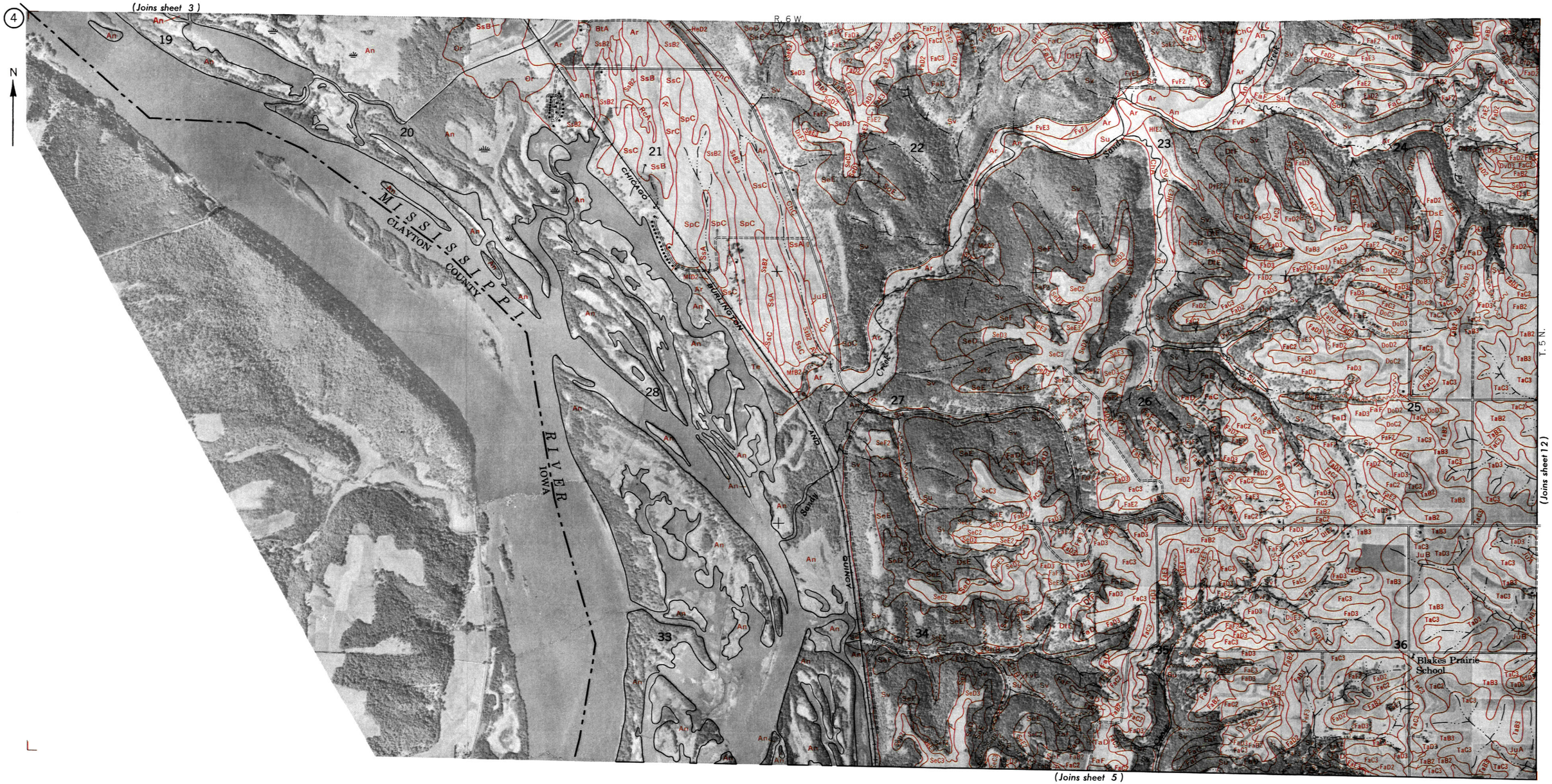
0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 4



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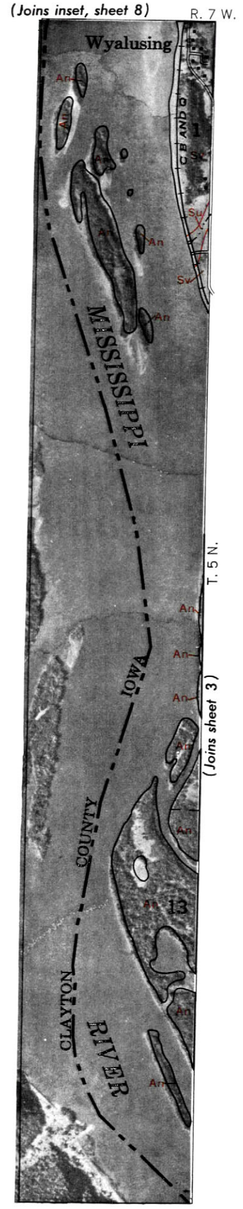

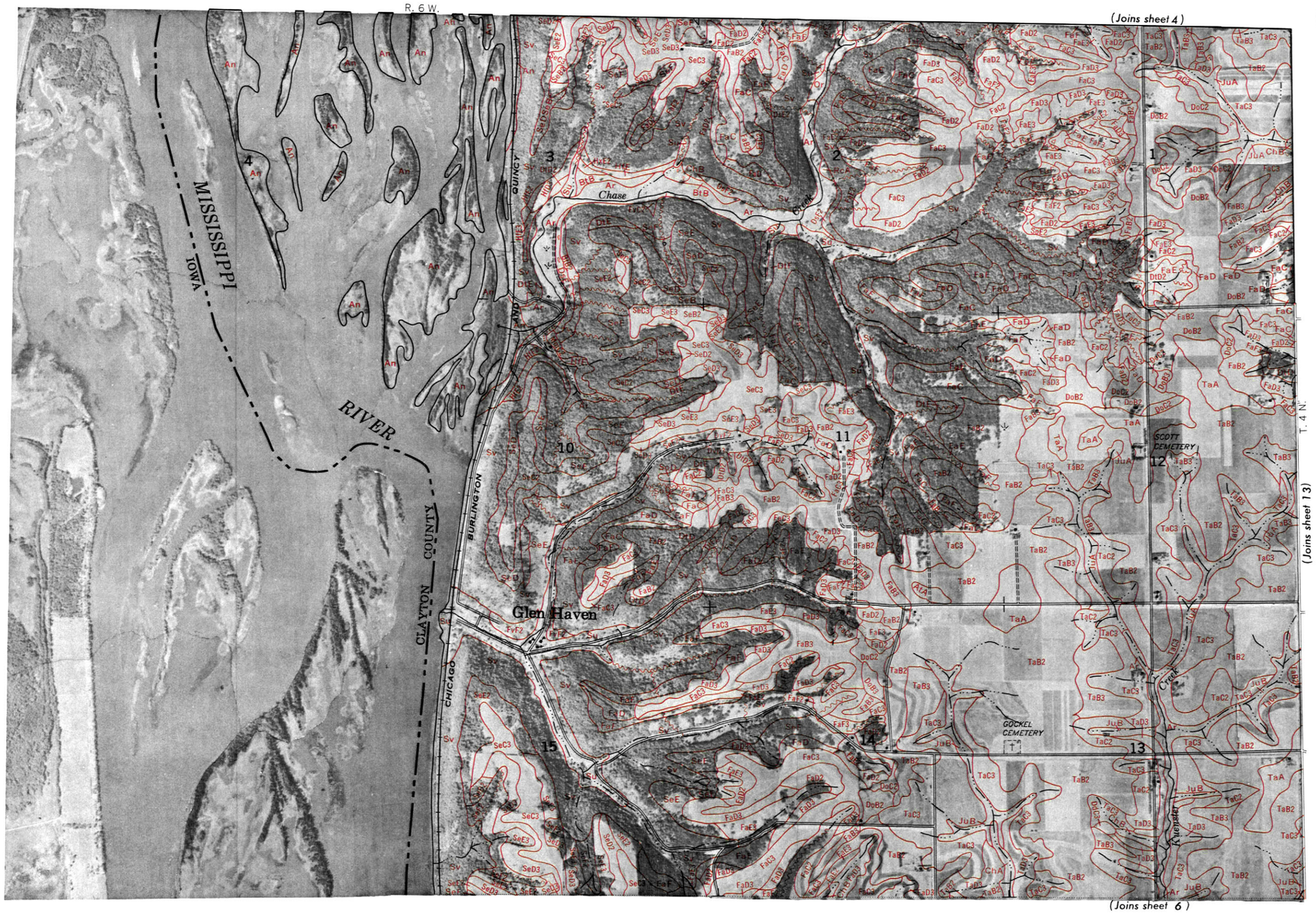

5

N

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

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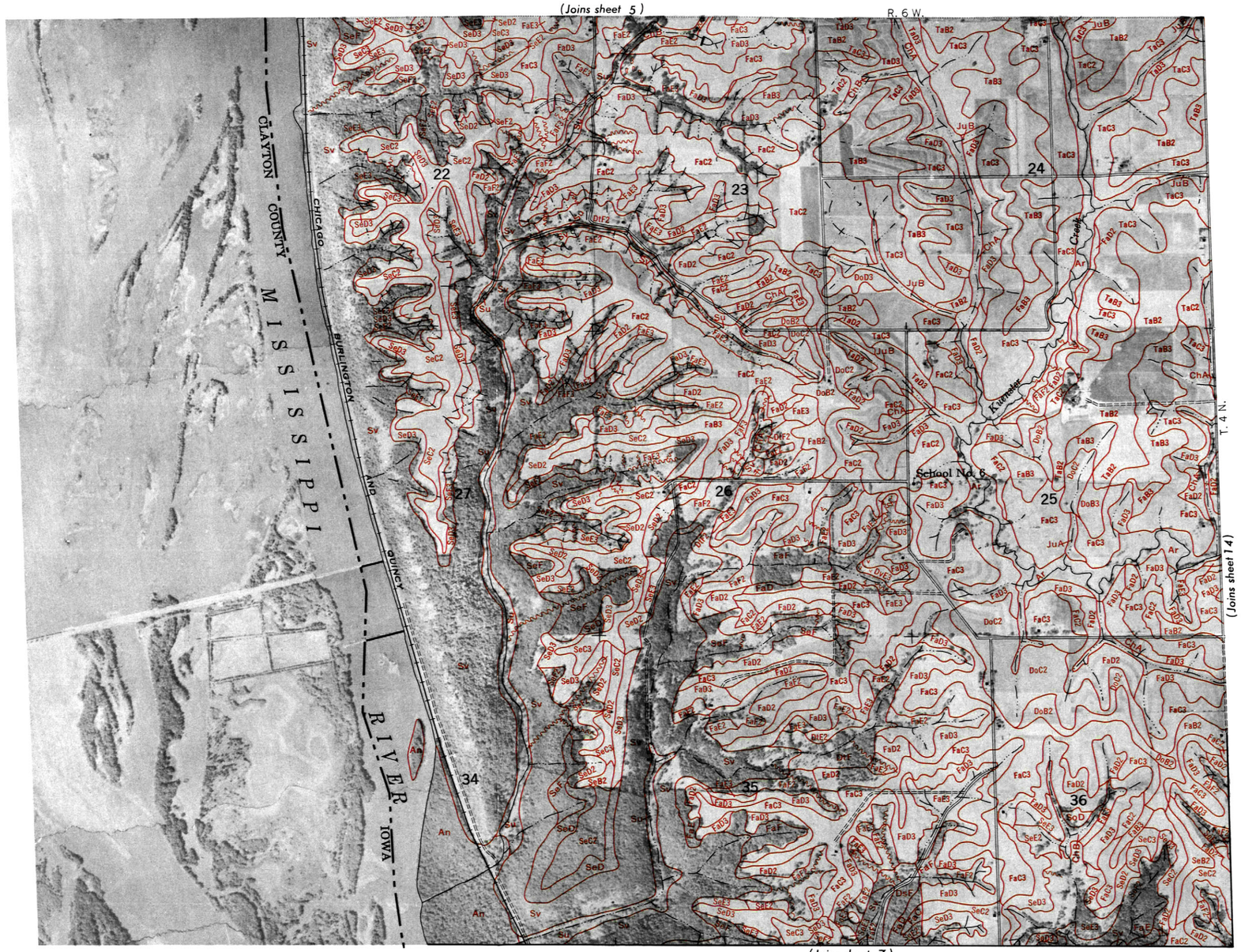

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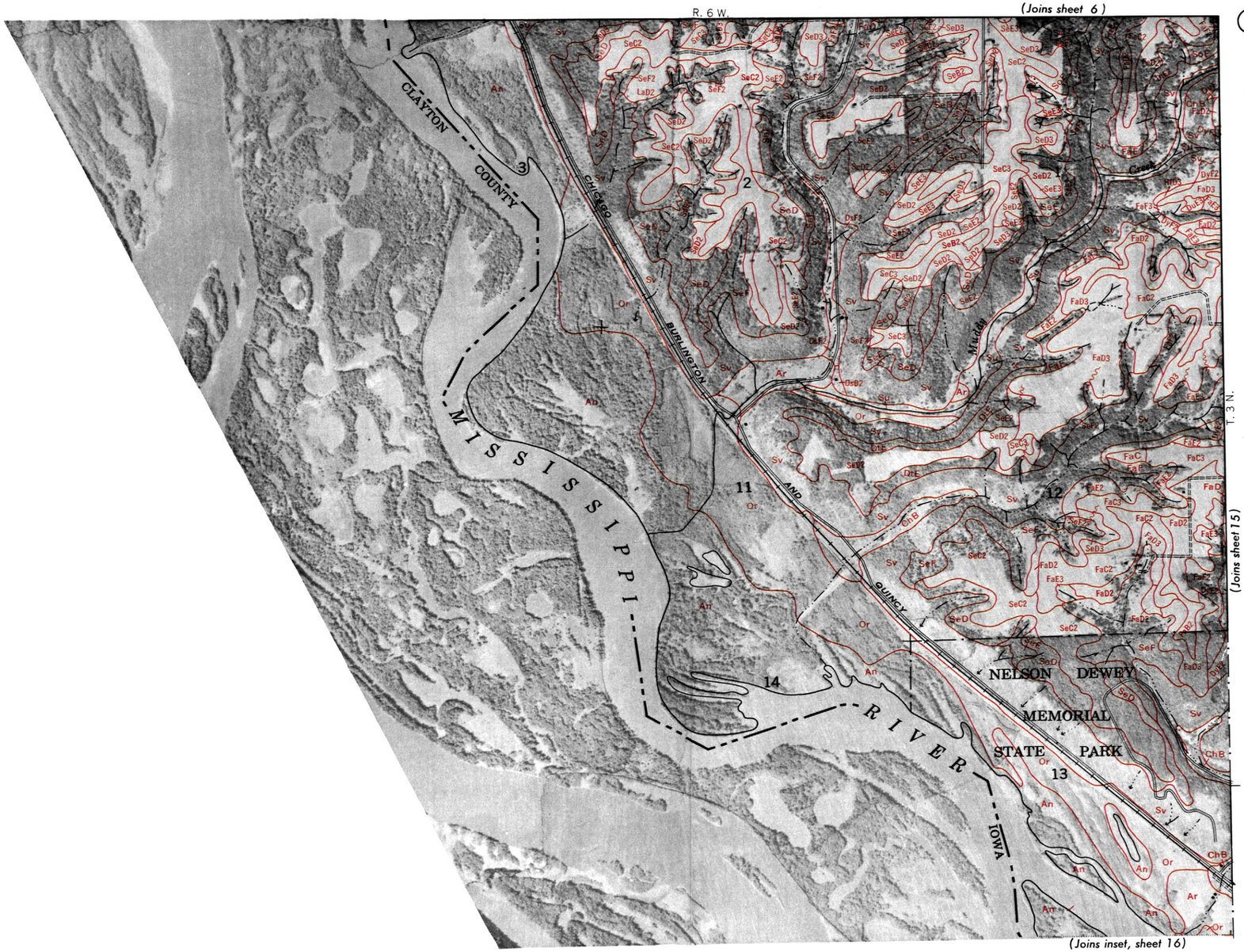

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

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N

(Joins inset, sheet 1)

R. 7 W.

UNITED STATES WILDLIFE SERVICE

MISSISSIPPI RIVER

CLAYTON COUNTY

IOWA

CRAWFORD

24

25

36

T. 6 N.

(Joins sheet 2)

(Joins inset, sheet 5)

WISCONSIN RIVER

CRAWFORD COUNTY

Warner

Creek

23

24

25

26

27

33

34

35

36

T. 7 N.

R. 5 W.

(Joins sheet 18)

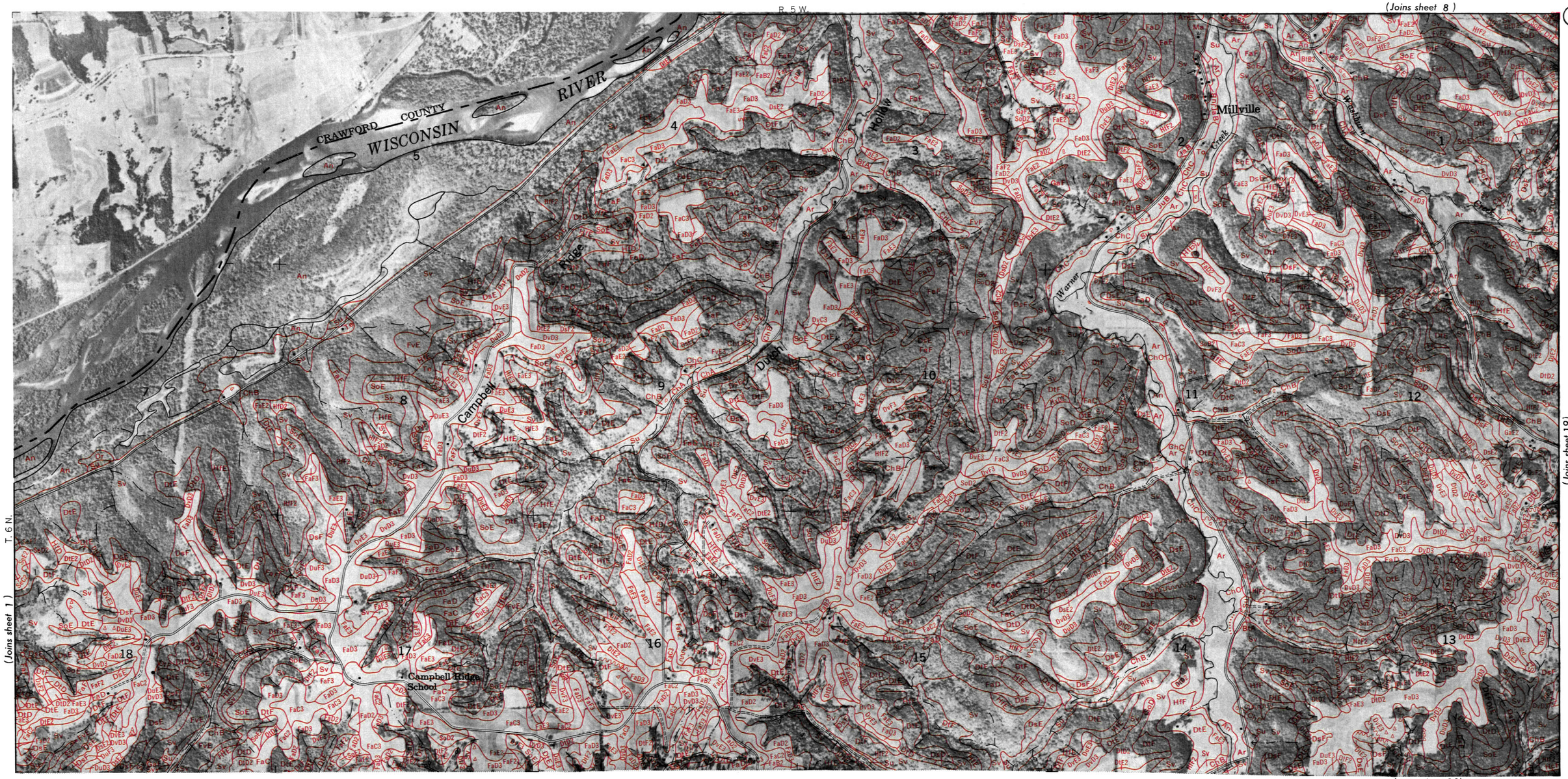
(Joins sheet 9)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 9



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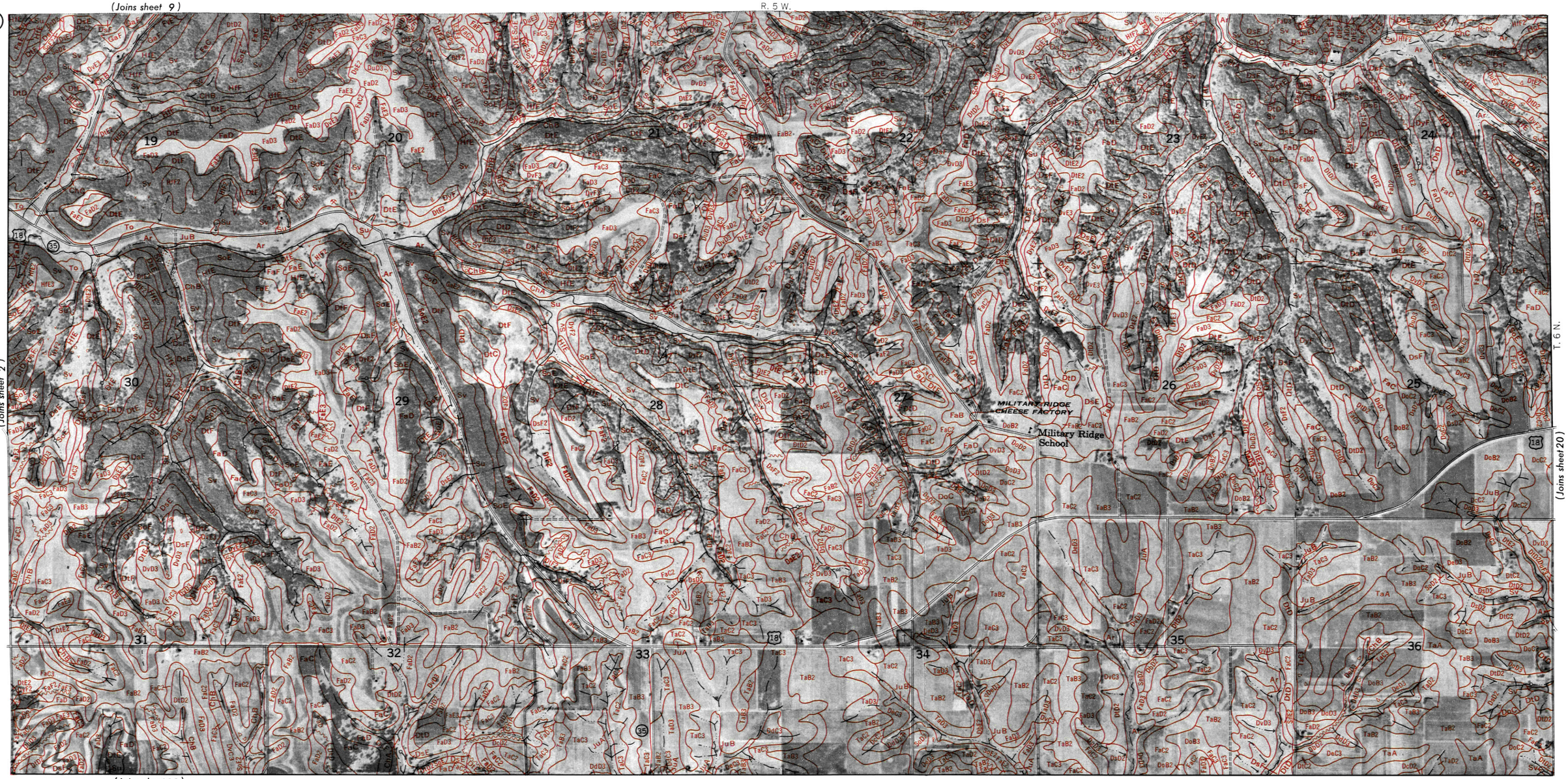

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

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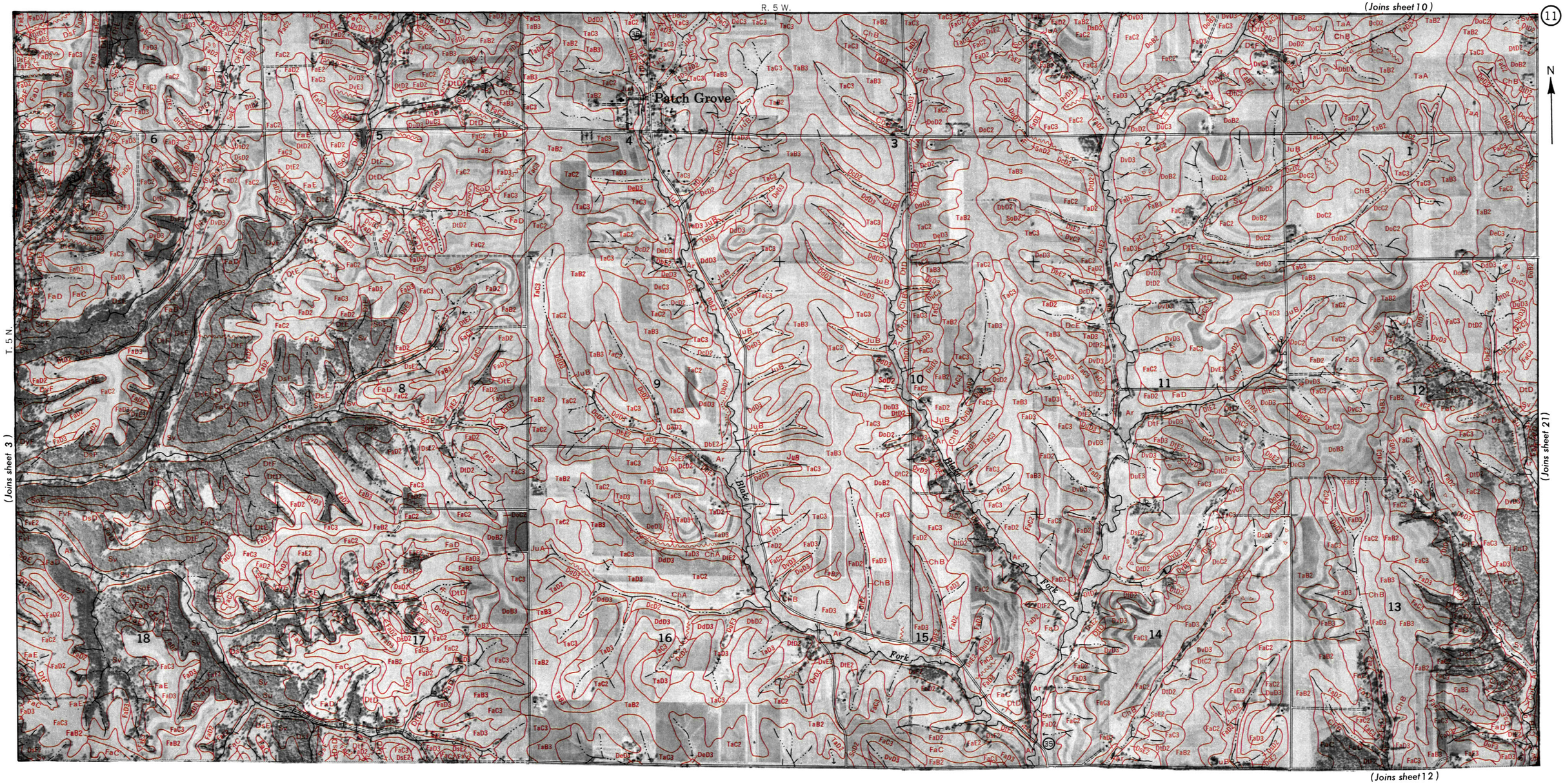

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GRANT COUNTY, WISCONSIN—SHEET NUMBER 12

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 13

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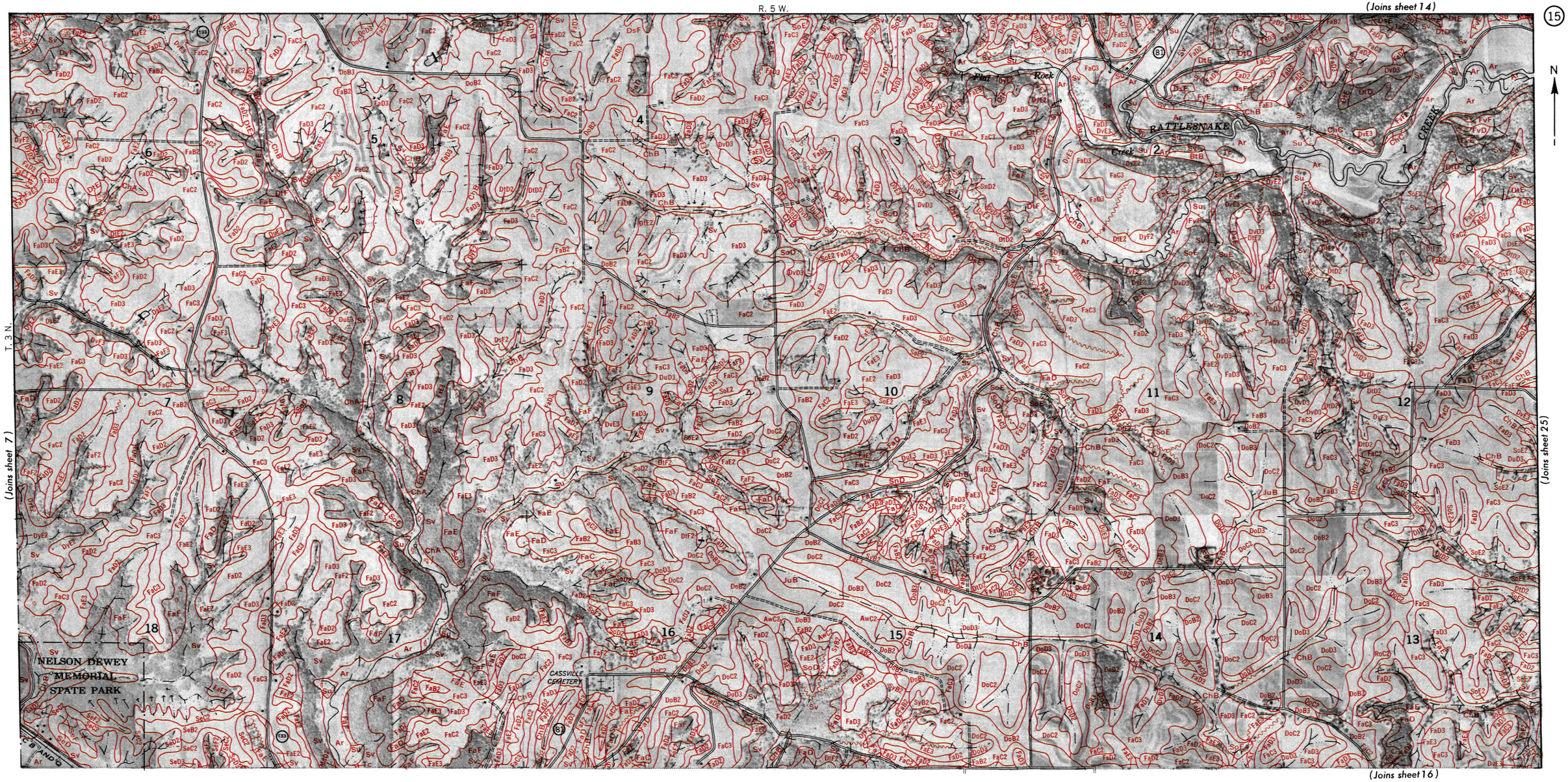
Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 14

GRANT COUNTY, WISCONSIN—SHEET NUMBER 15



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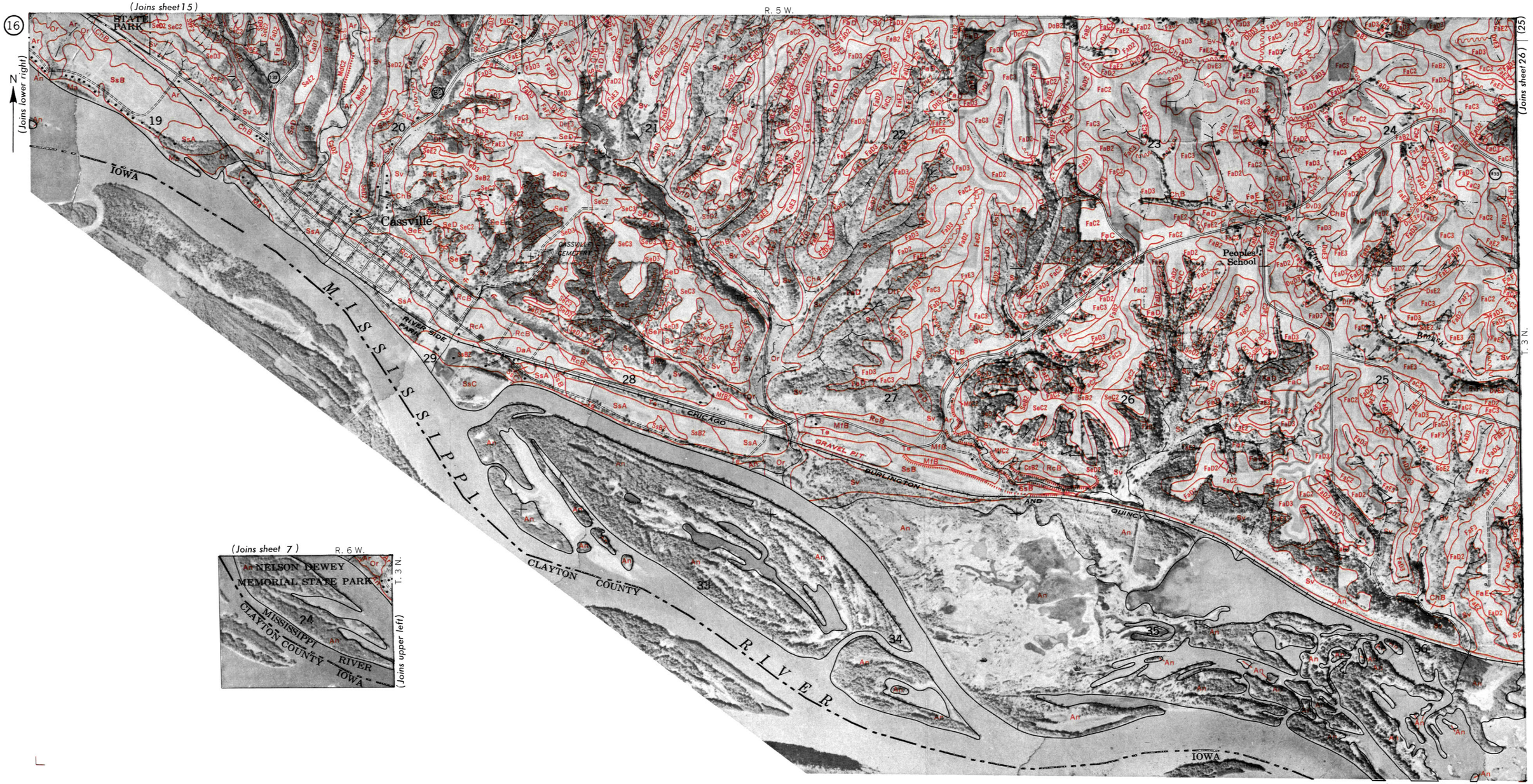
GRANT COUNTY, WISCONSIN—SHEET NUMBER 16



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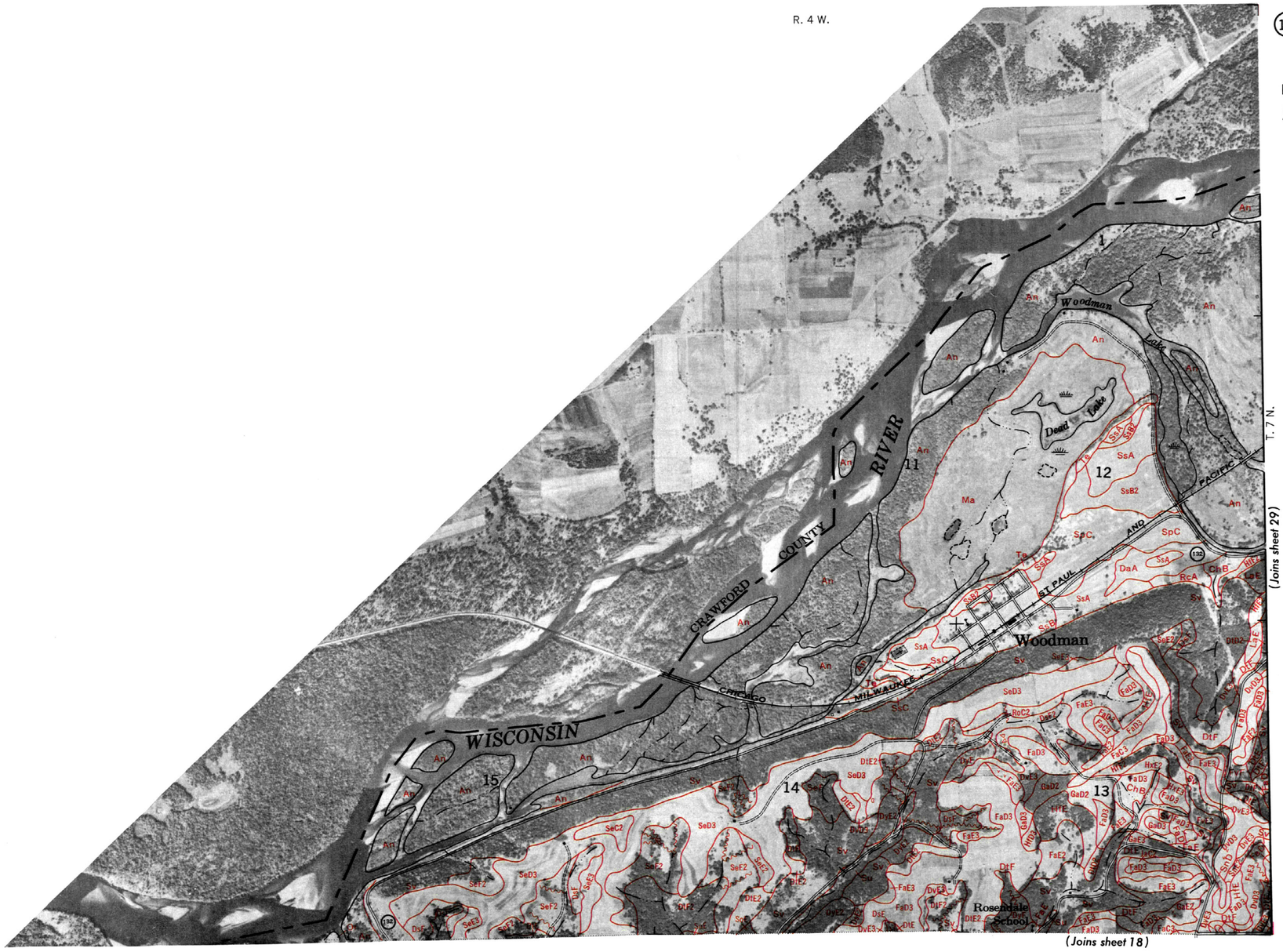

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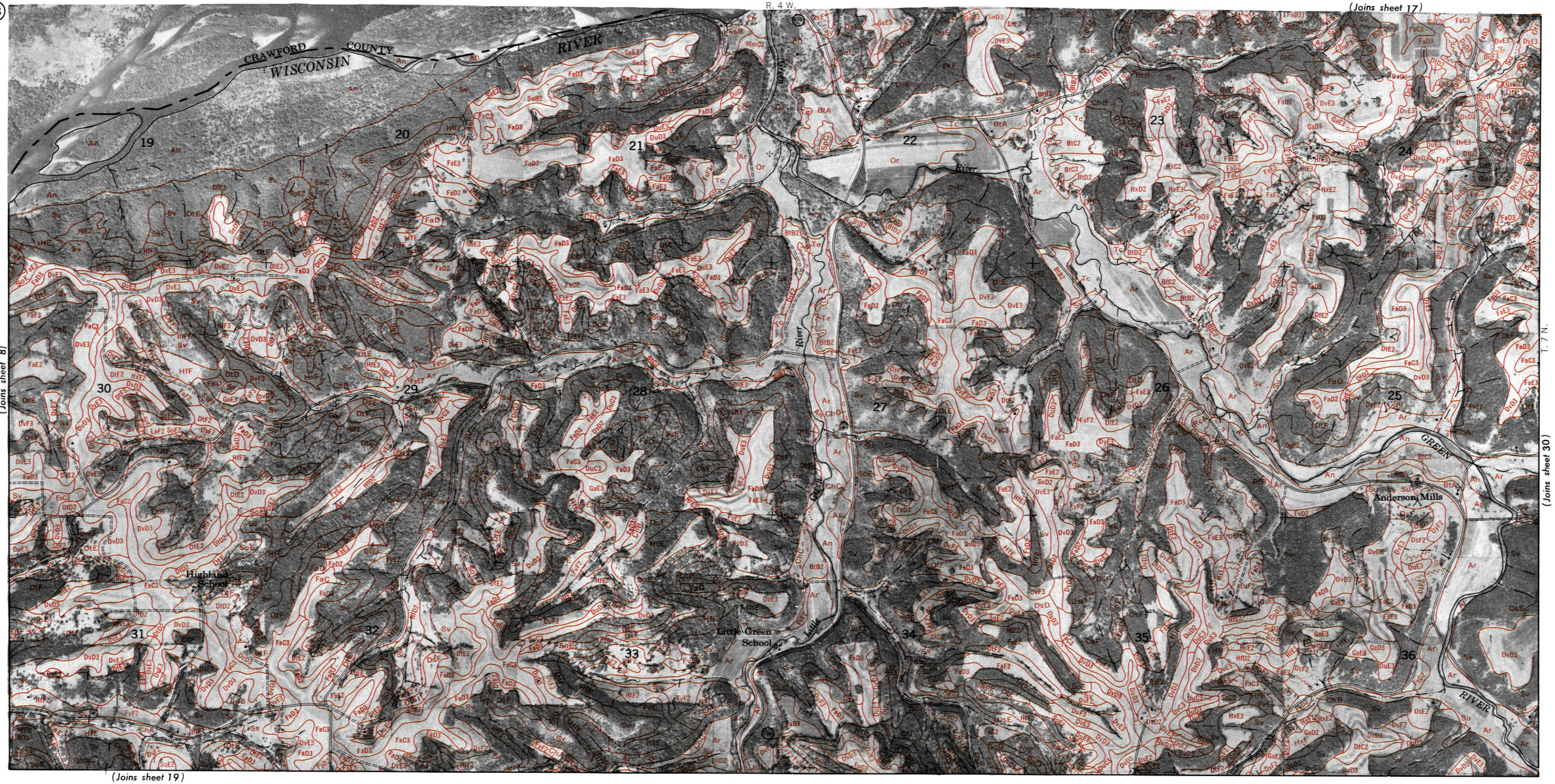
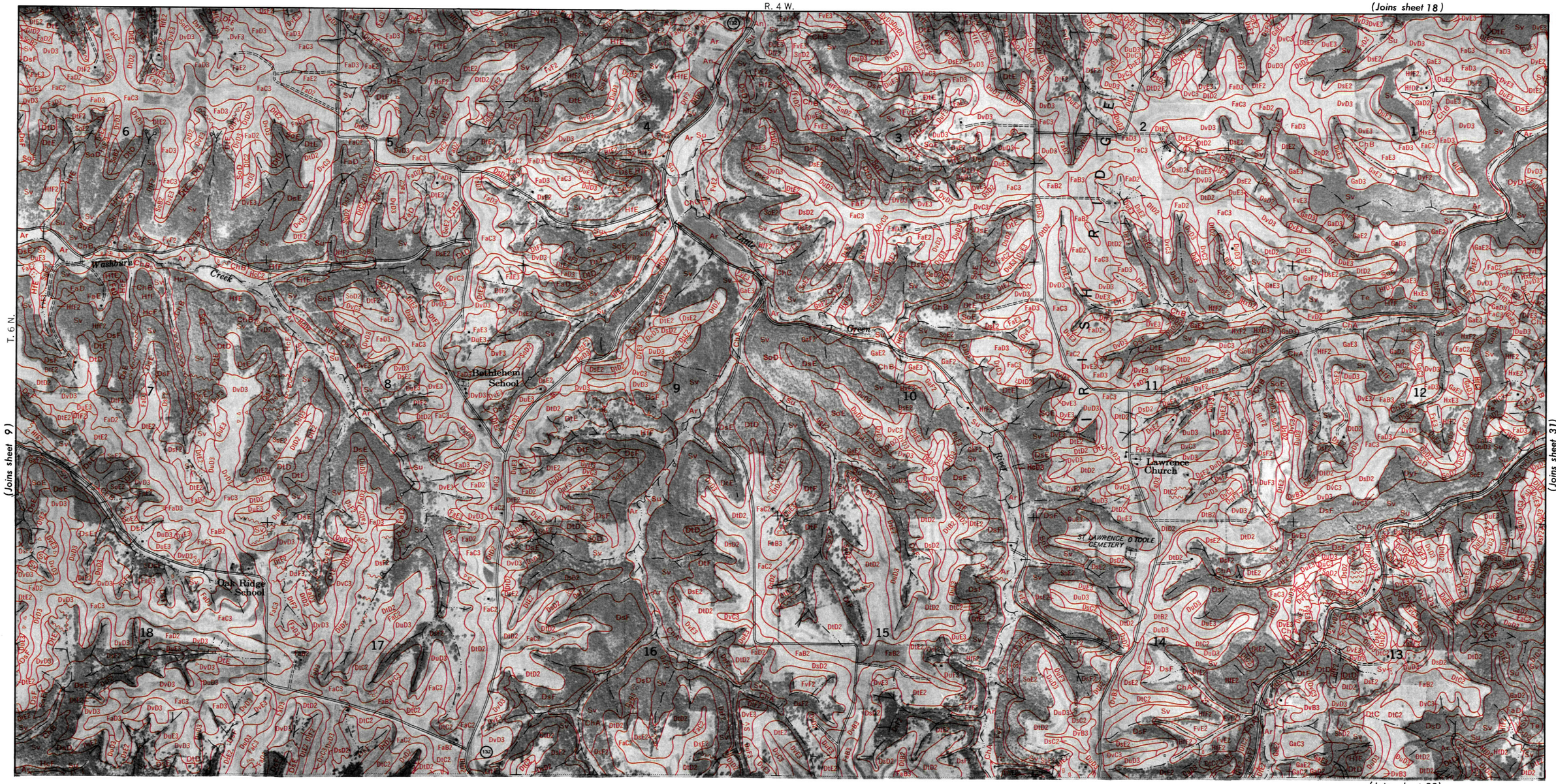


0 ½ 1 Mile Scale 1:20000 0 5000 Feet



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GRANT COUNTY, WISCONSIN—SHEET NUMBER 20

GRANT COUNTY, WISCONSIN—SHEET NUMBER 21

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0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 22

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

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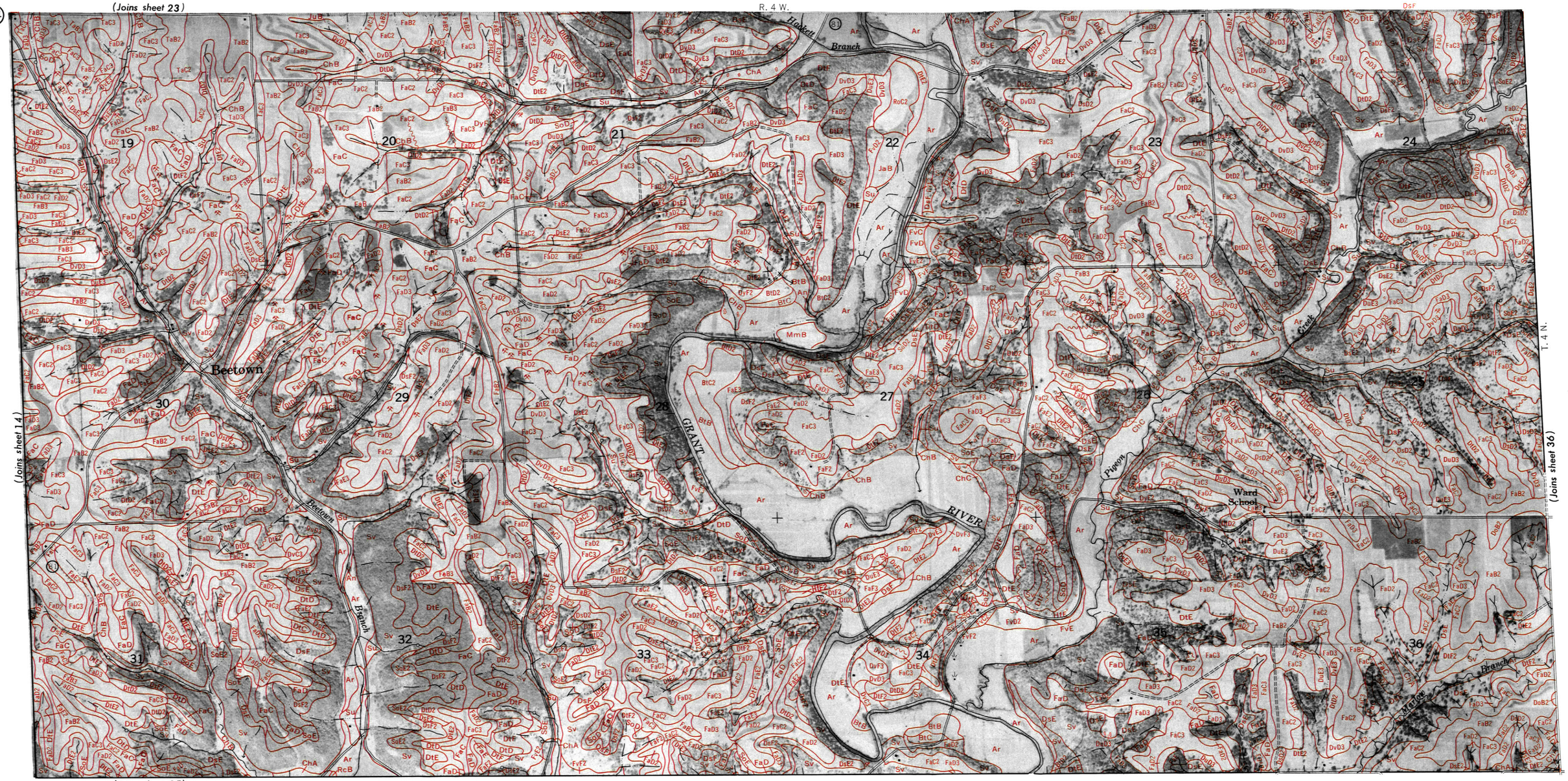
0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 24



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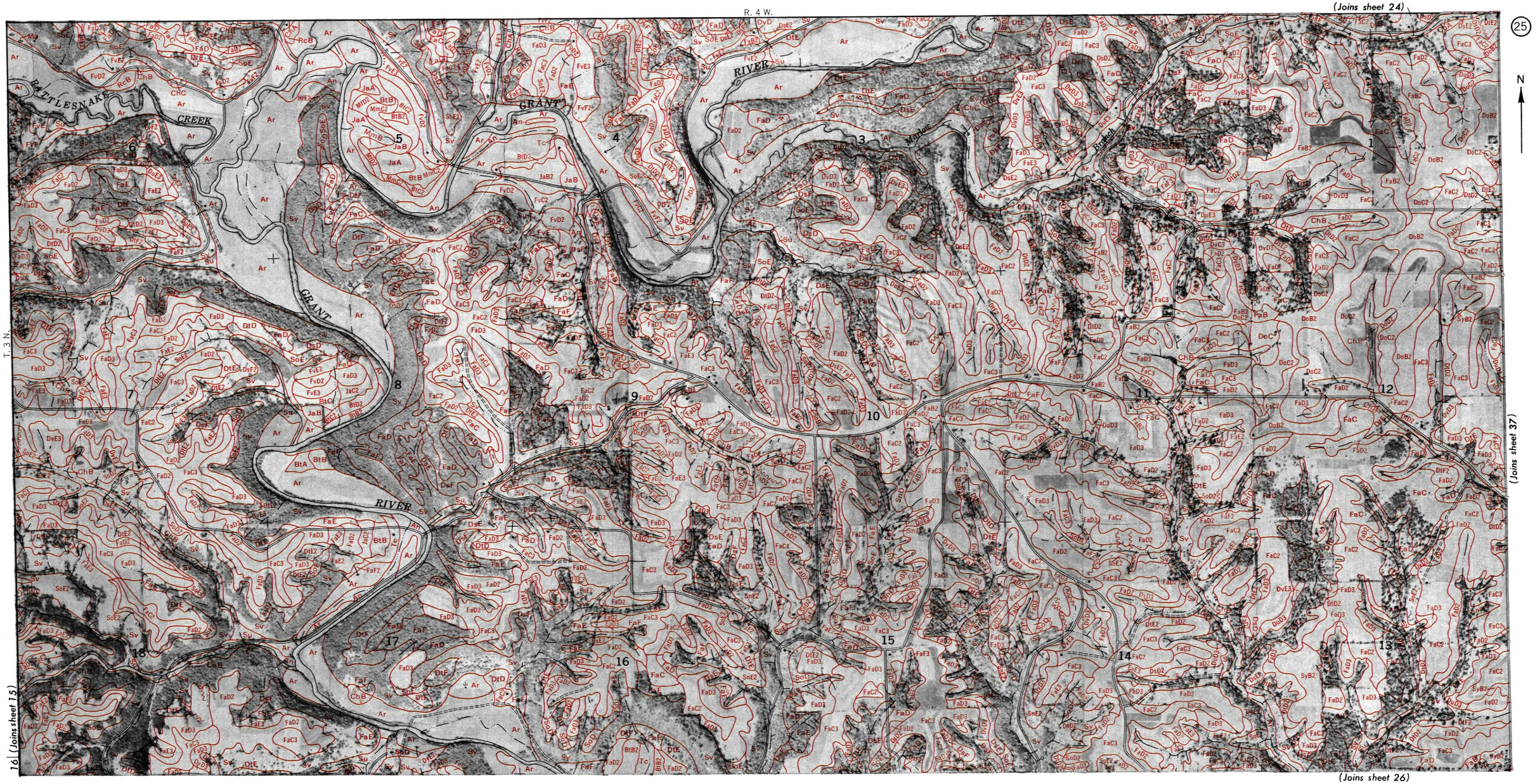

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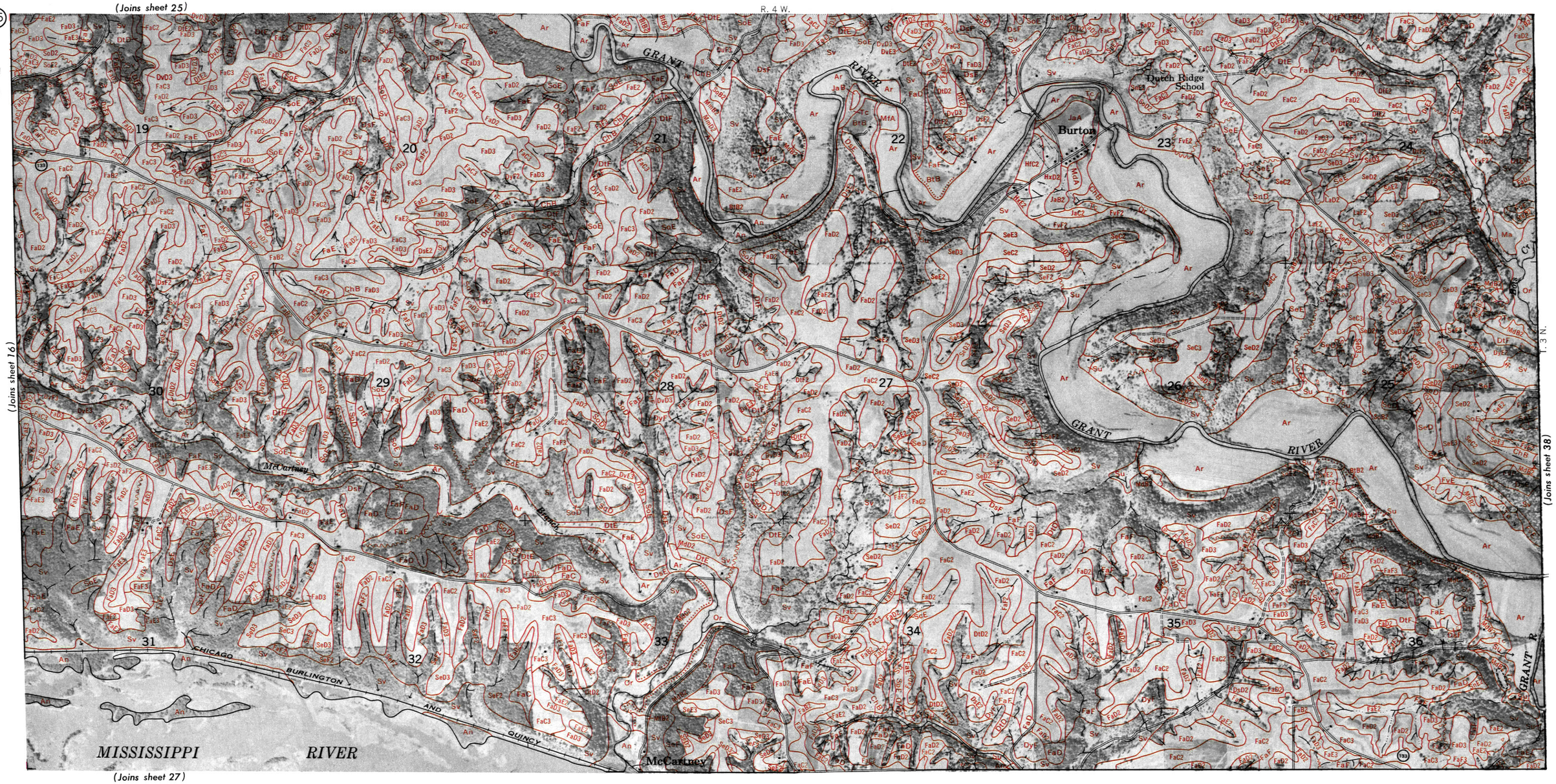
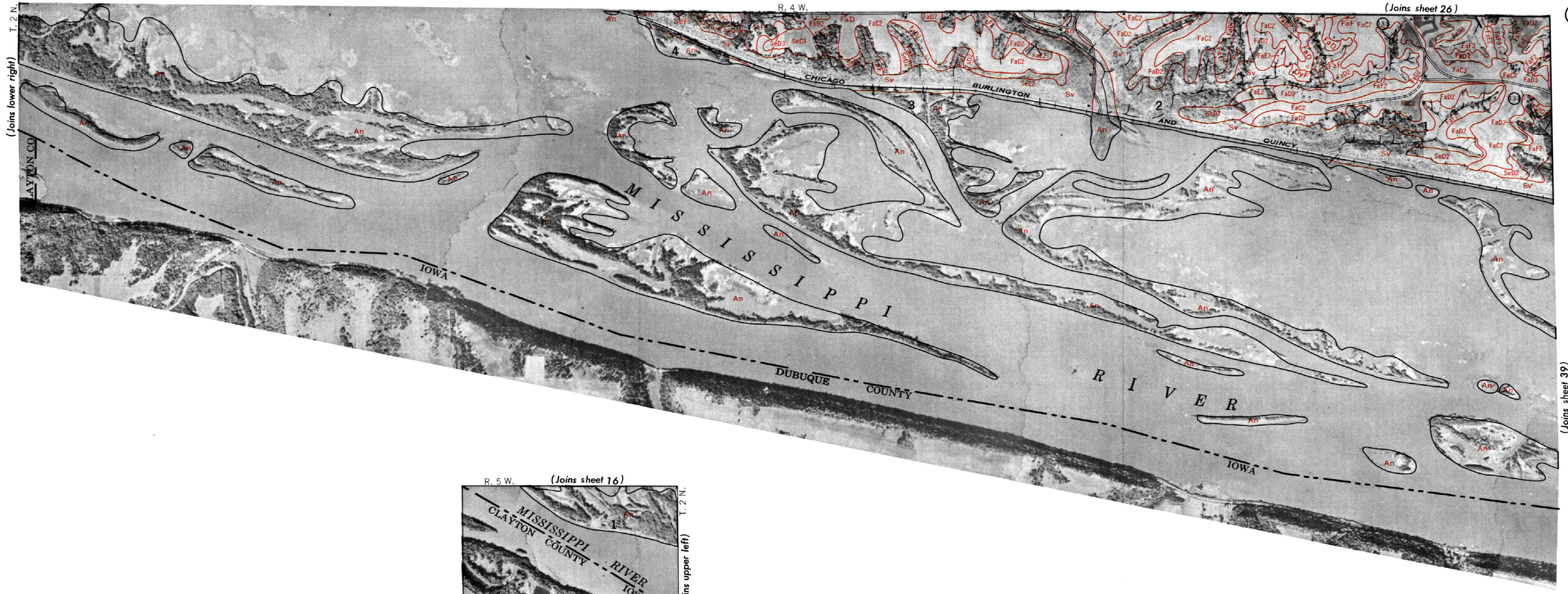


0 ½ 1 Mile Scale 1:20000 0 5000 Feet



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Range, township, and section corners shown on this map are indefinite.

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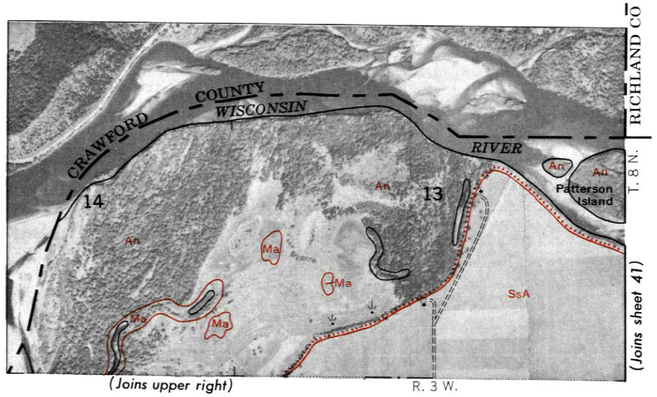


(Joins lower left)

R. 3 W.

BOSCOBEL AIRPORT

Boscobel

PACIFIC AND SOUTHERN

MILWAUKEE

CHICAGO

Crooked Creek

Sanders Creek

WISCONSIN RIVER

CRAWFORD COUNTY

T. 8 N.

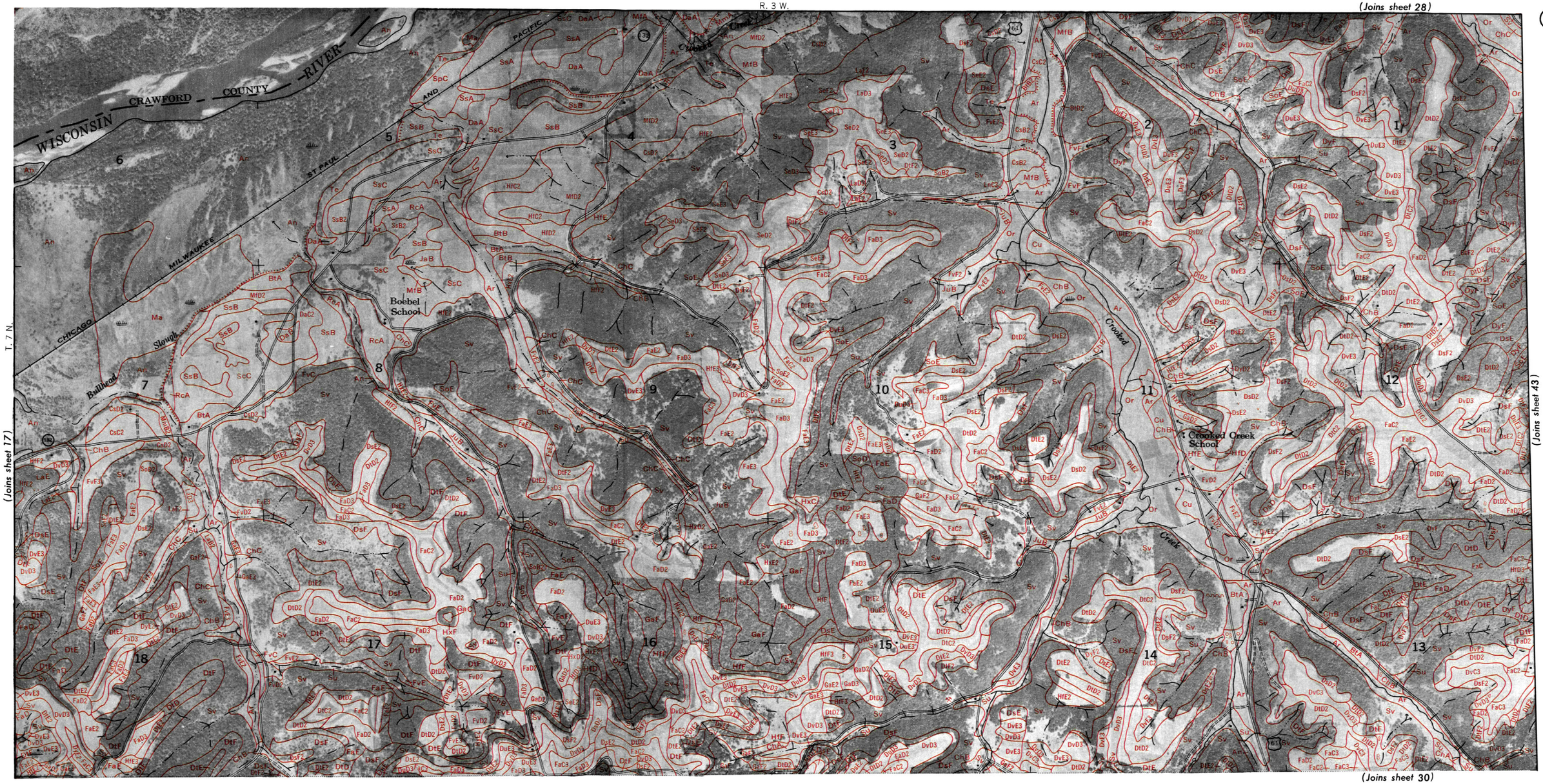
(Joins sheet 42)

(Joins sheet 29)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 30

GRANT COUNTY, WISCONSIN—SHEET NUMBER 31

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

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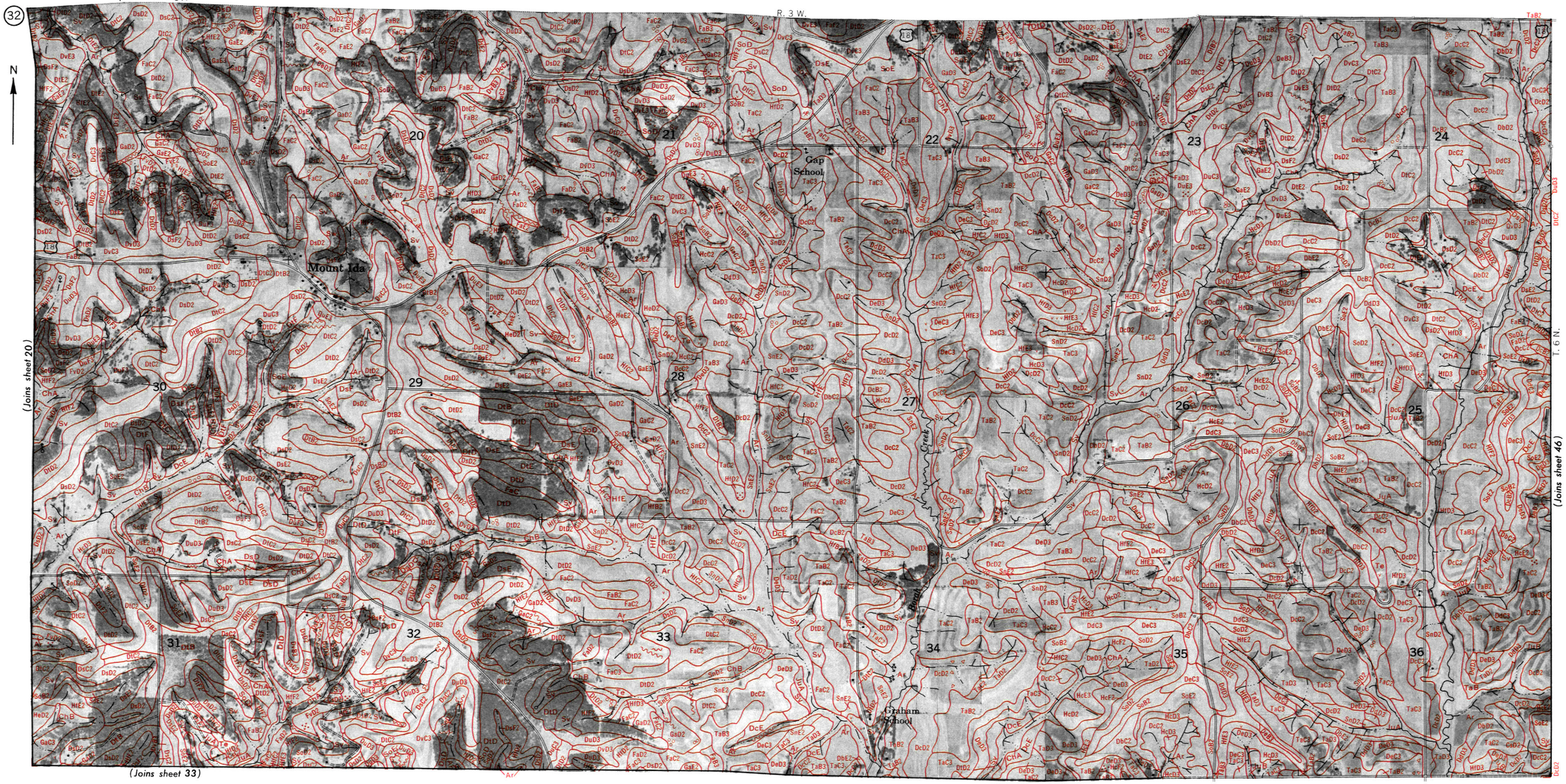
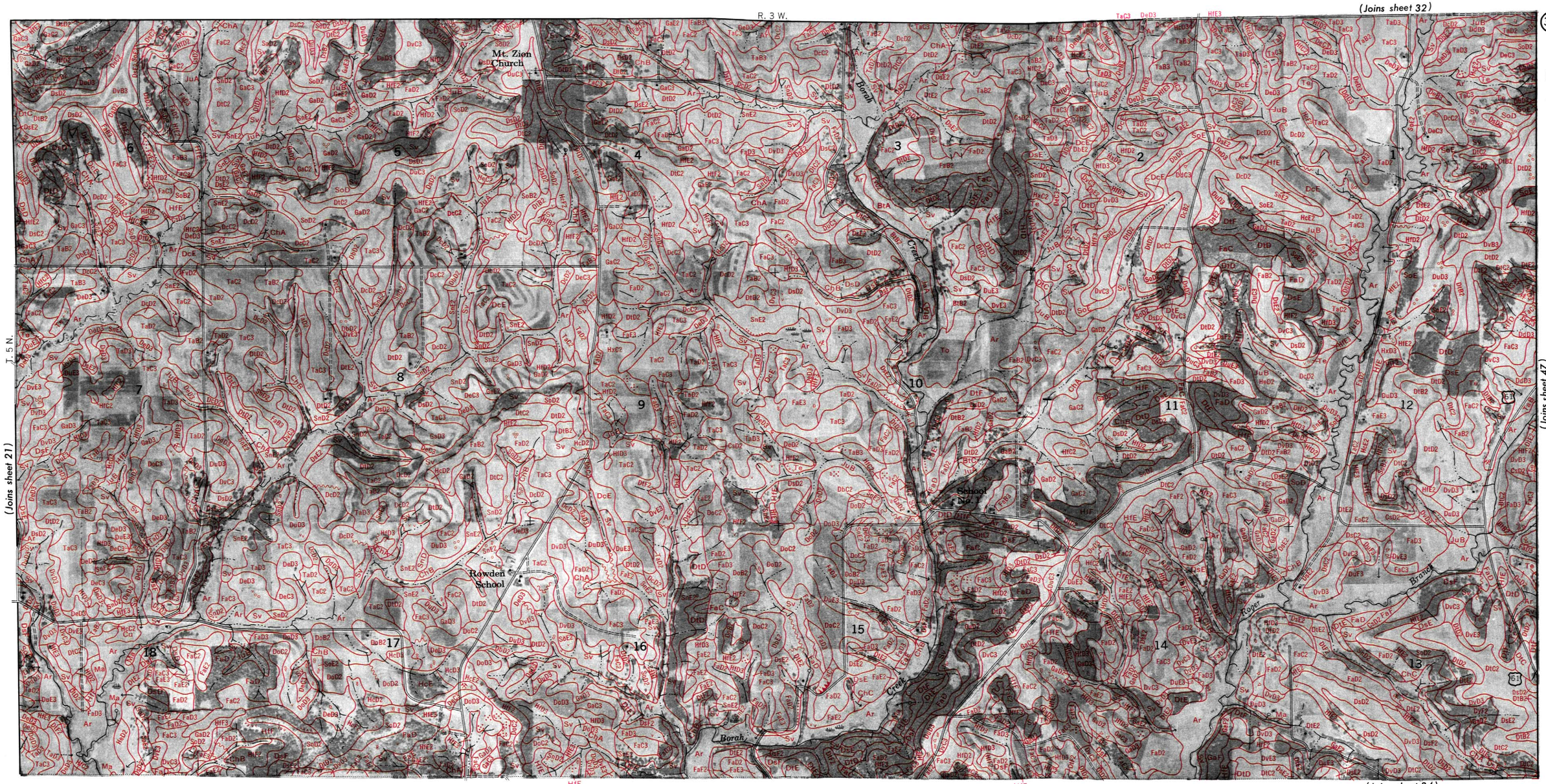
GRANT COUNTY, WISCONSIN—SHEET NUMBER 32



GRANT COUNTY, WISCONSIN—SHEET NUMBER 33



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

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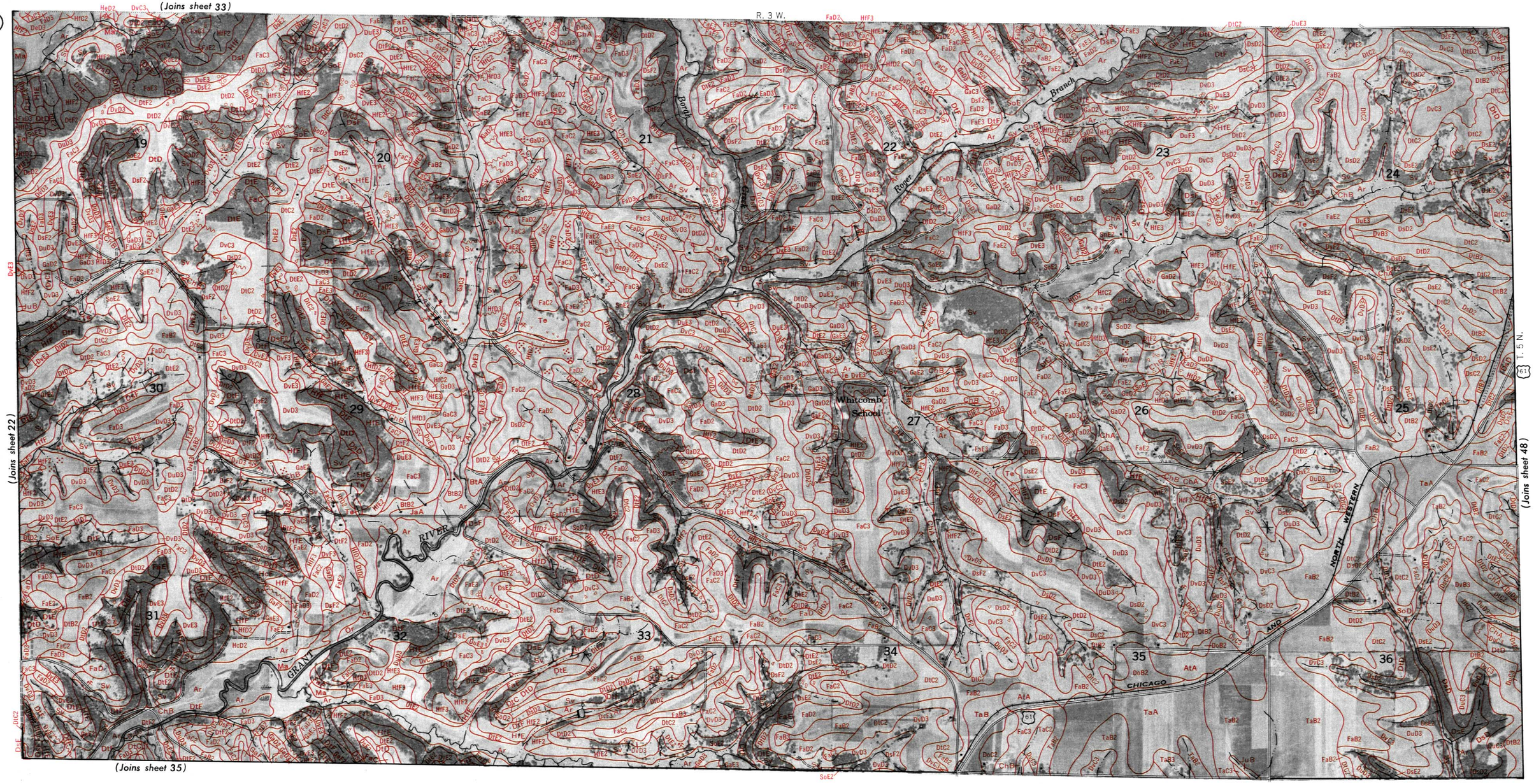
GRANT COUNTY, WISCONSIN — SHEET NUMBER 34



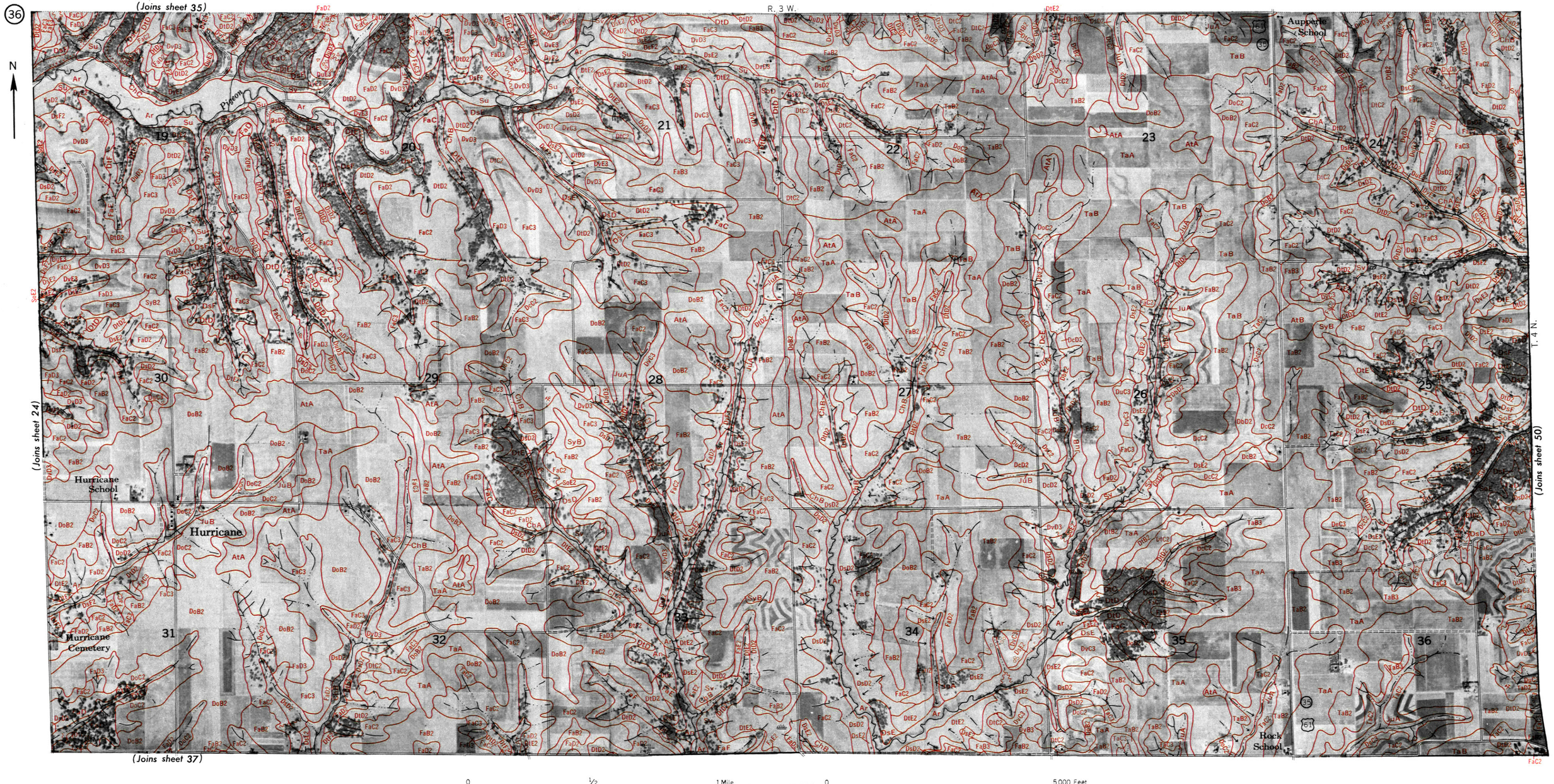
GRANT COUNTY, WISCONSIN—SHEET NUMBER 35

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

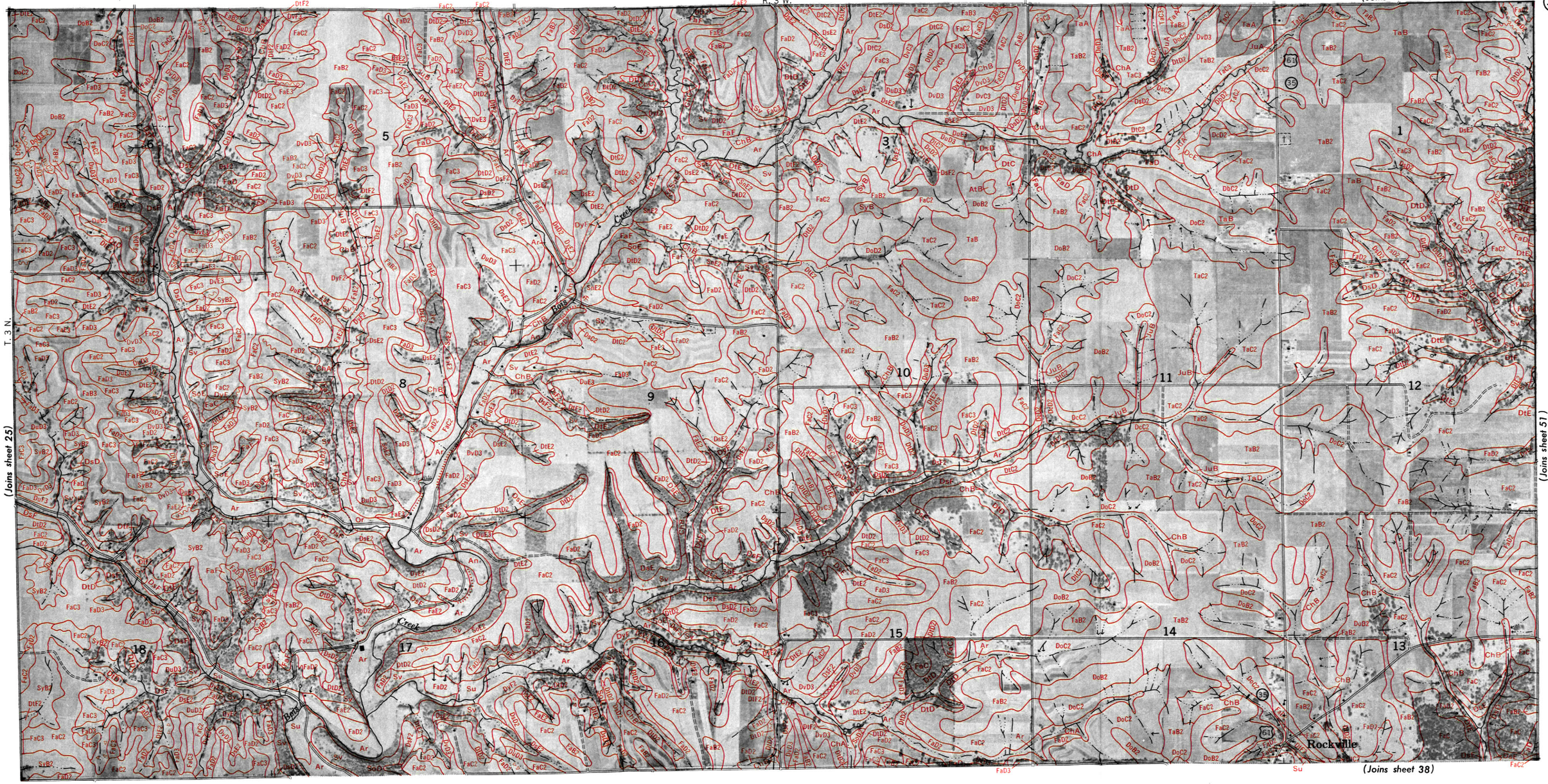
Range, township, and section corners shown on this map are indefinite.

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 36



GRANT COUNTY, WISCONSIN—SHEET NUMBER 37



37

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 38

GRANT COUNTY, WISCONSIN—SHEET NUMBER 39

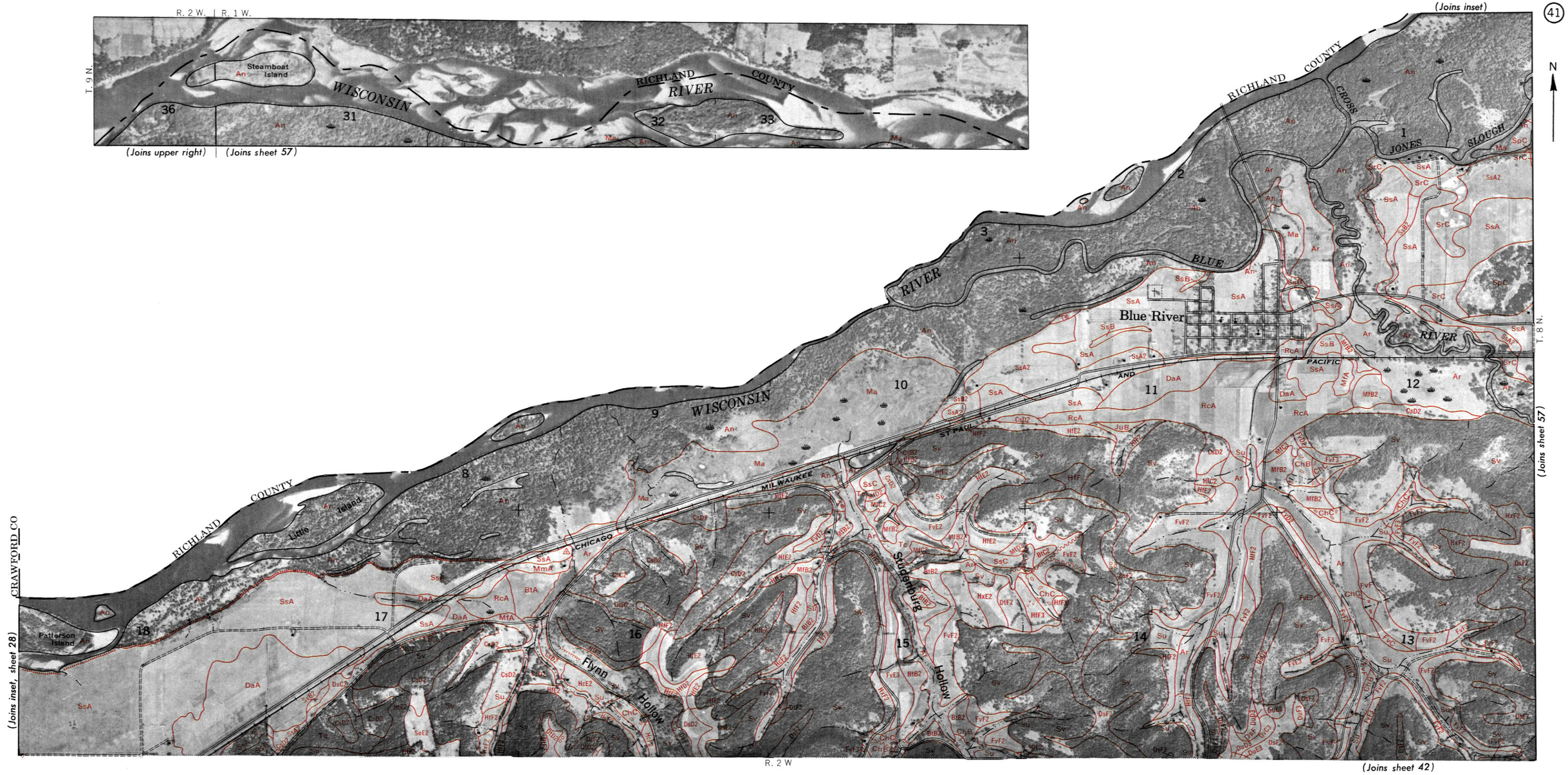
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

(40)

N

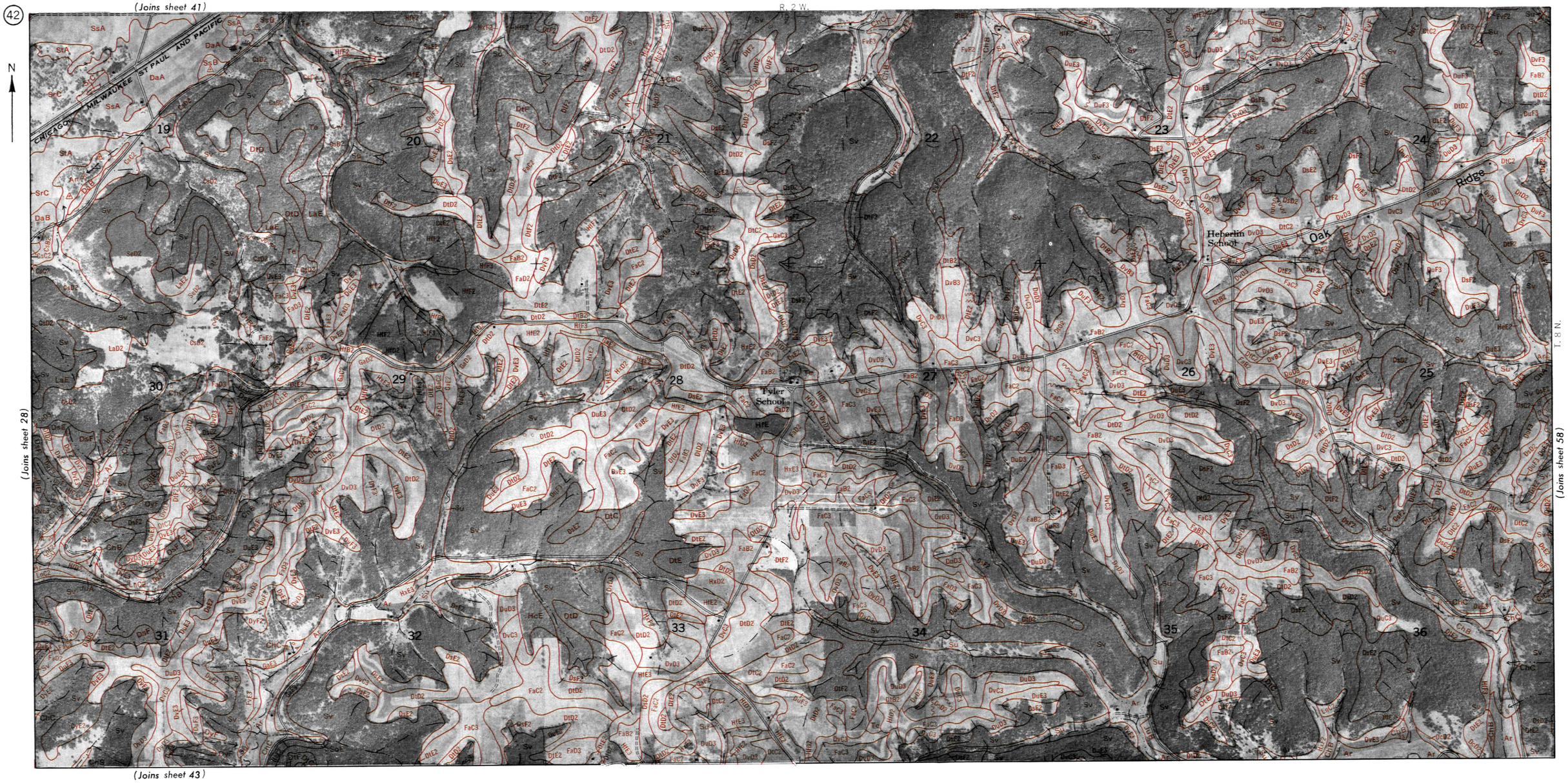
0 ½ 1 Mile Scale 1:20000 0 5000 Feet



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

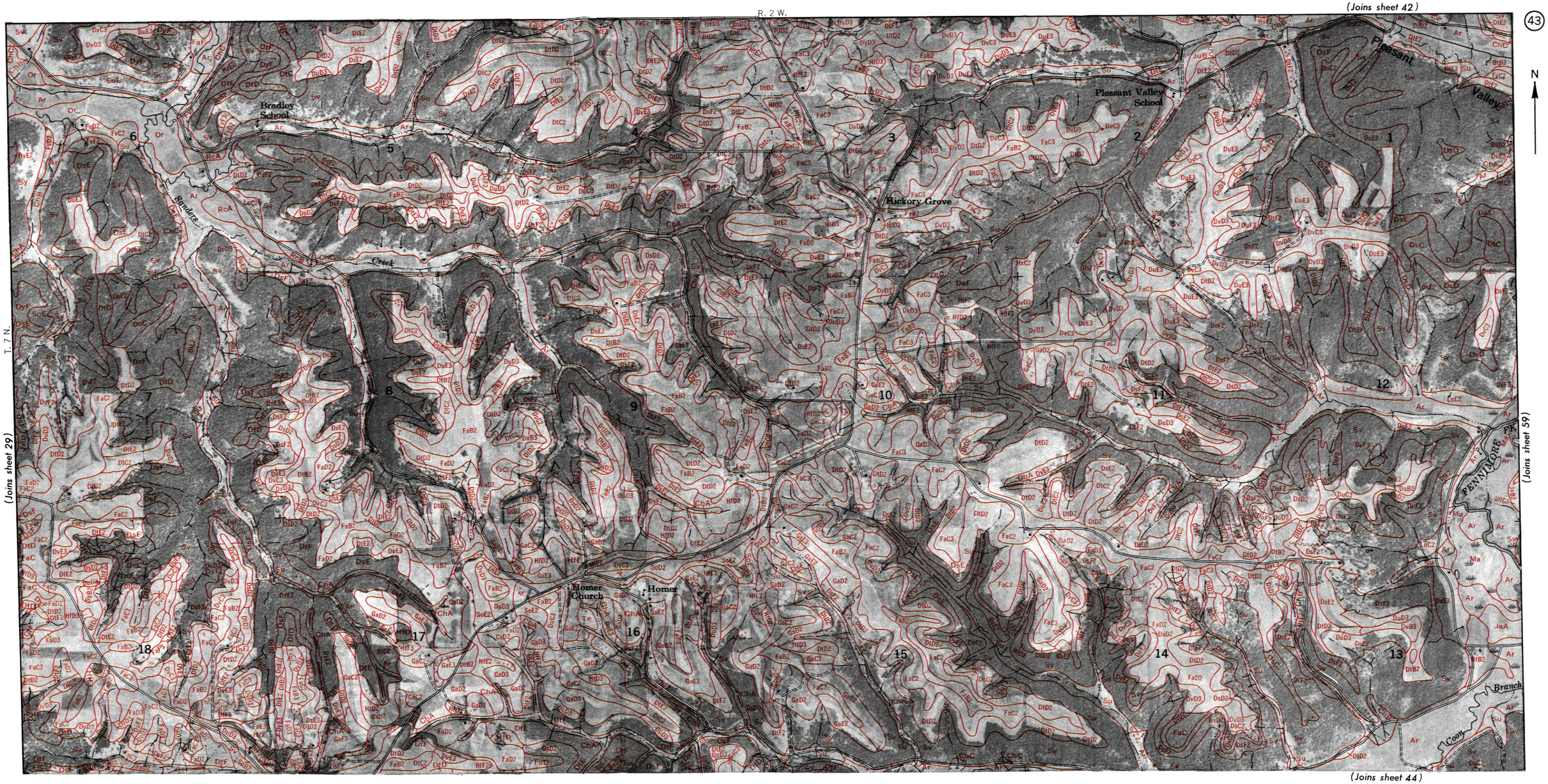
Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 42



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 43



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

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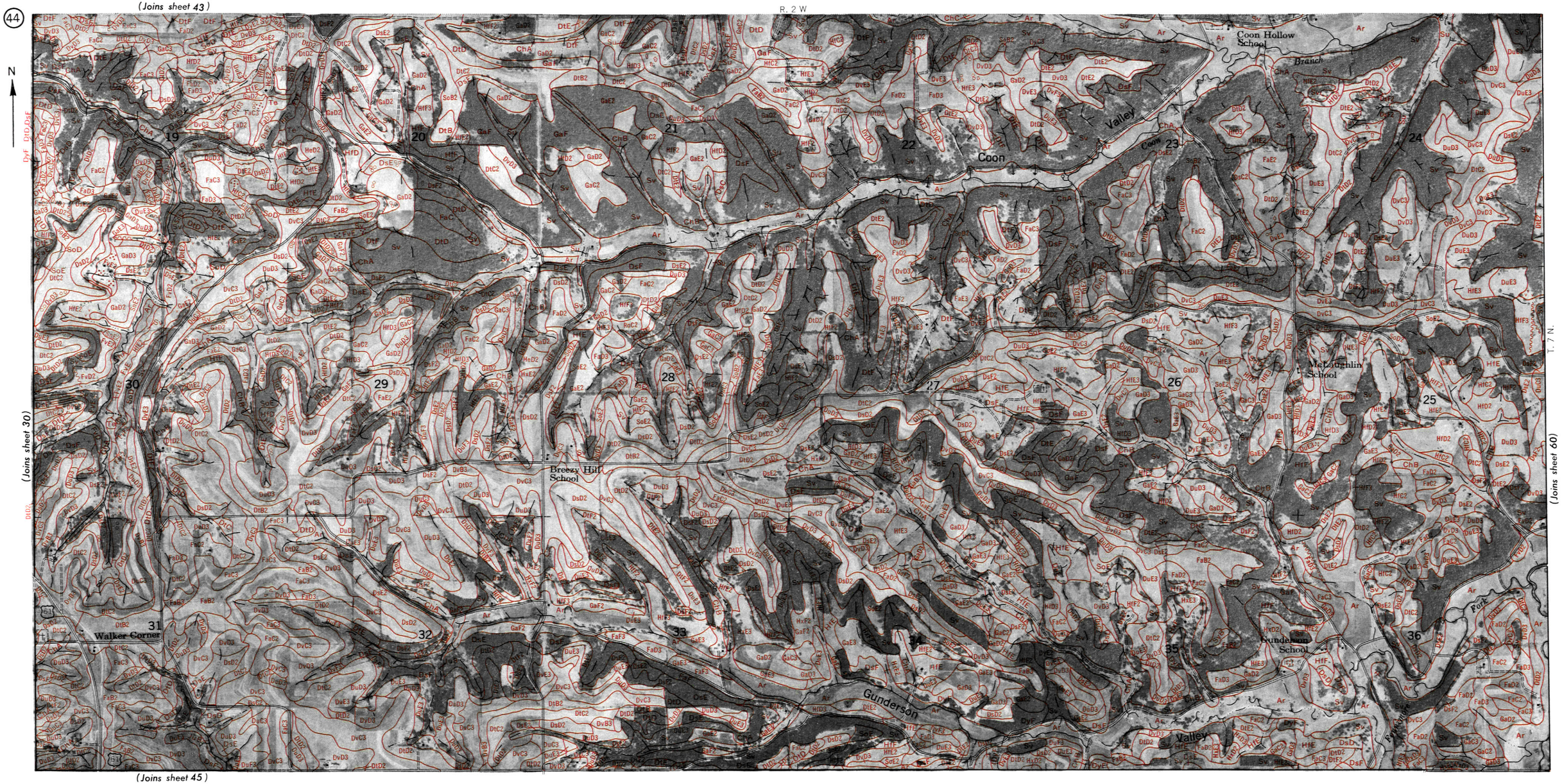
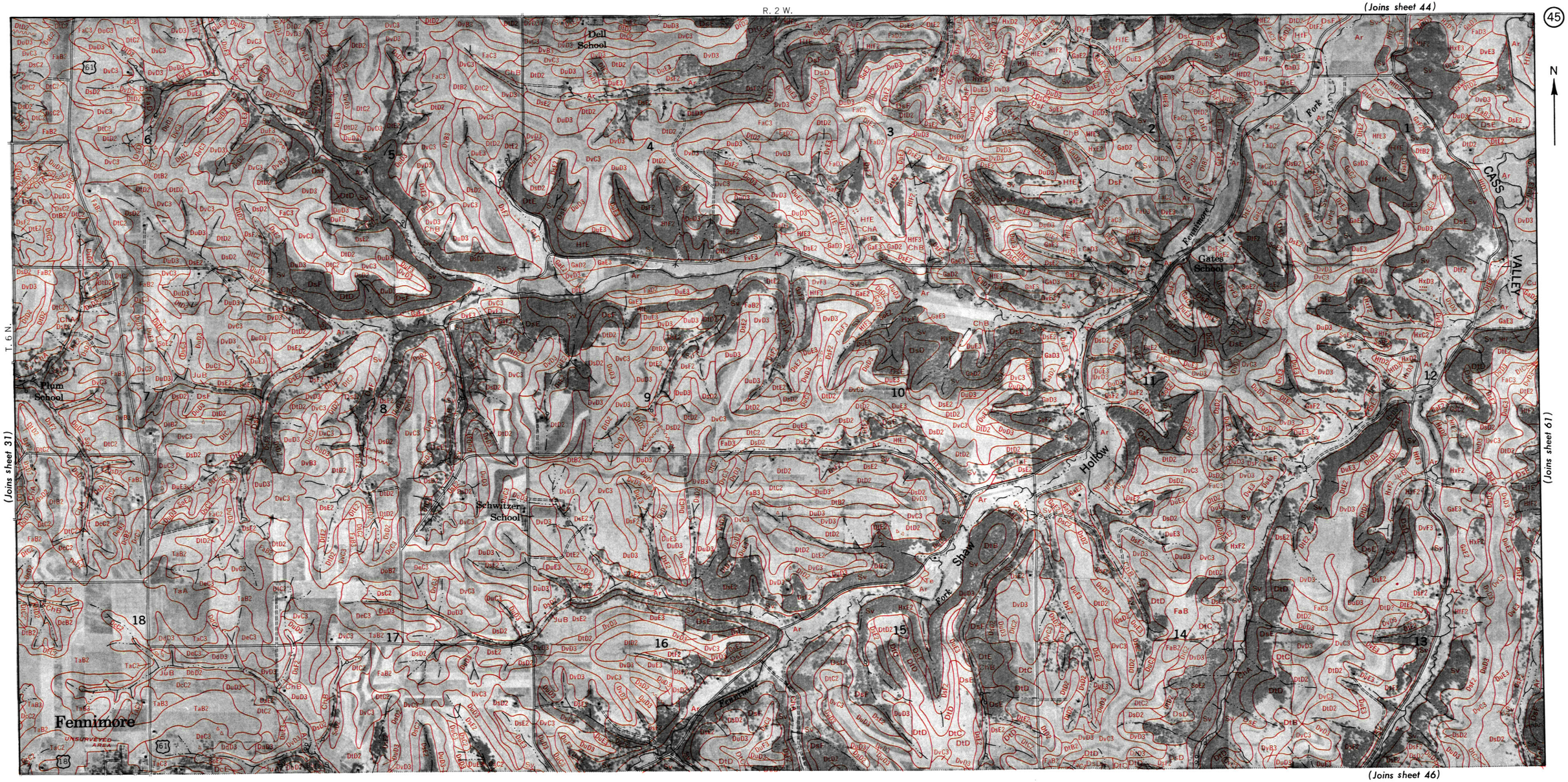
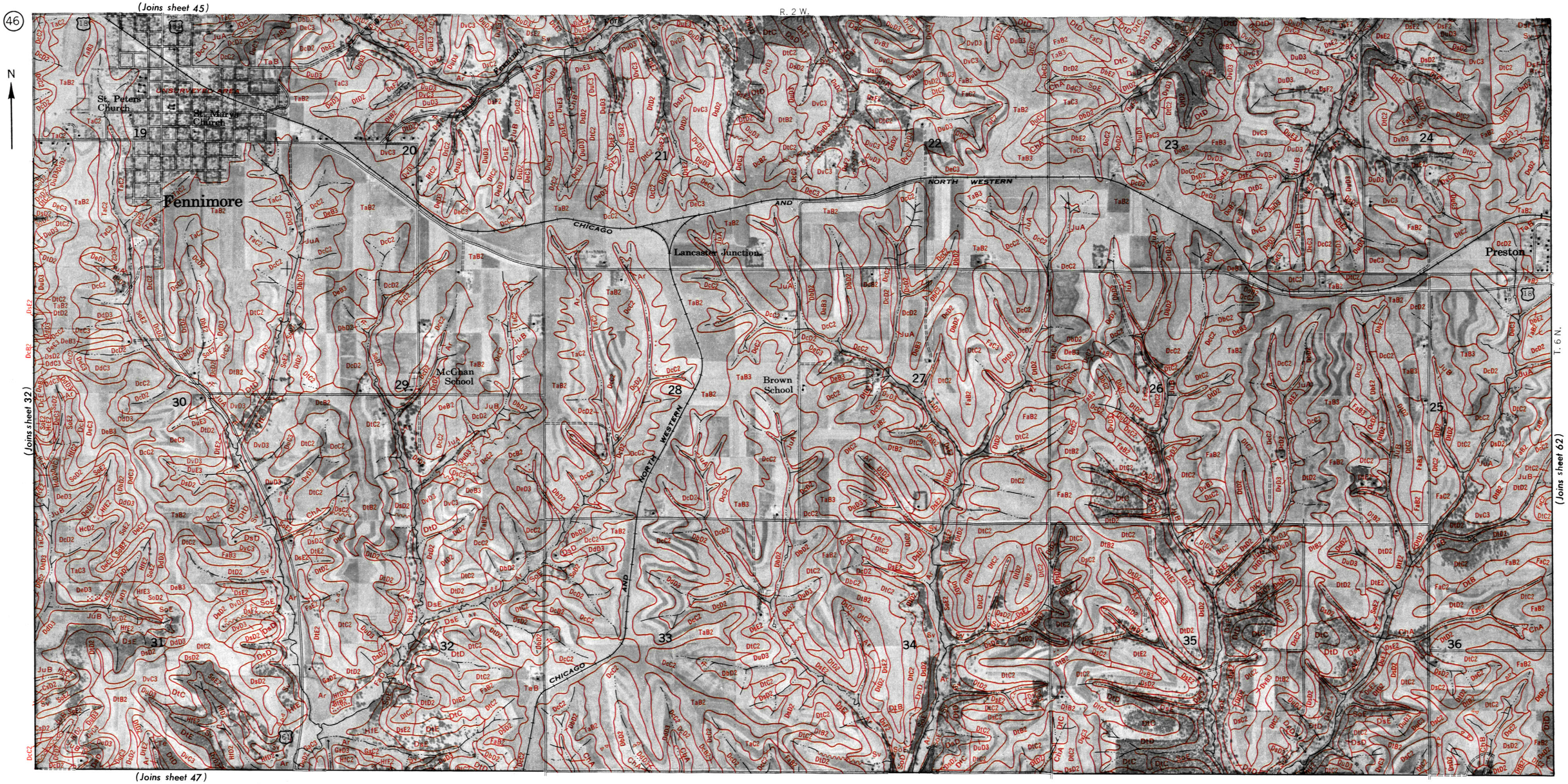

(44)
(Joins sheet 43)
R. 2 W
T. 7 N.
N
Coon Hollow School
Coon Valley
Coon Branch
McLaughlin School
Breezy Hill School
Walker Corner
Gunderson
Gunderson School
Gunderson Valley
Fork
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
(Joins sheet 30)
(Joins sheet 60)
(Joins sheet 45)
0
1/2
1 Mile
Scale 1:20000
0
5000 Feet



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 46

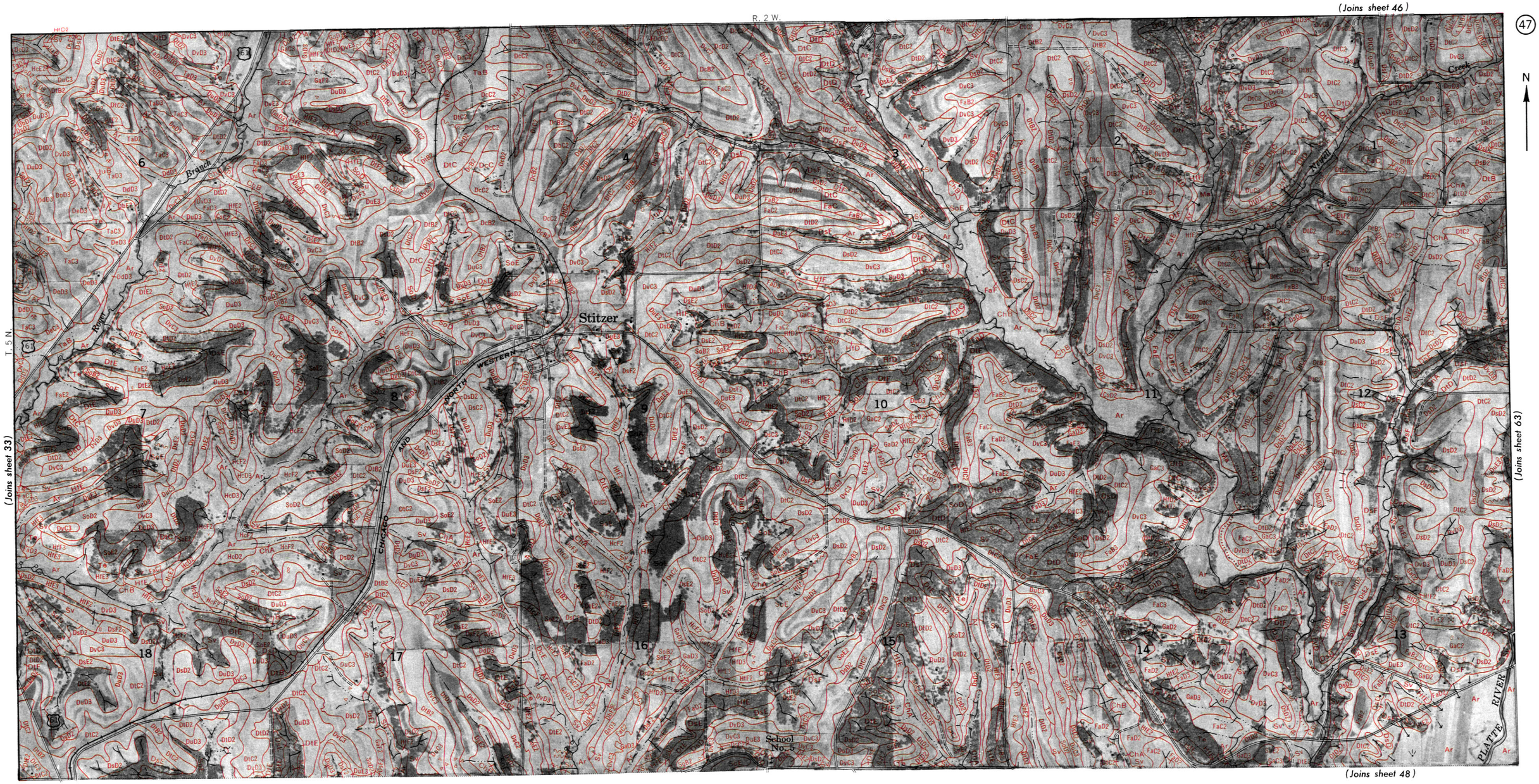


0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

(Joins sheet 46)

R. 2 W.

T. 5 N.



(Joins sheet 33)

(Joins sheet 63)

(Joins sheet 48)

N

Range, township, and section corners shown on this map are indefinite.

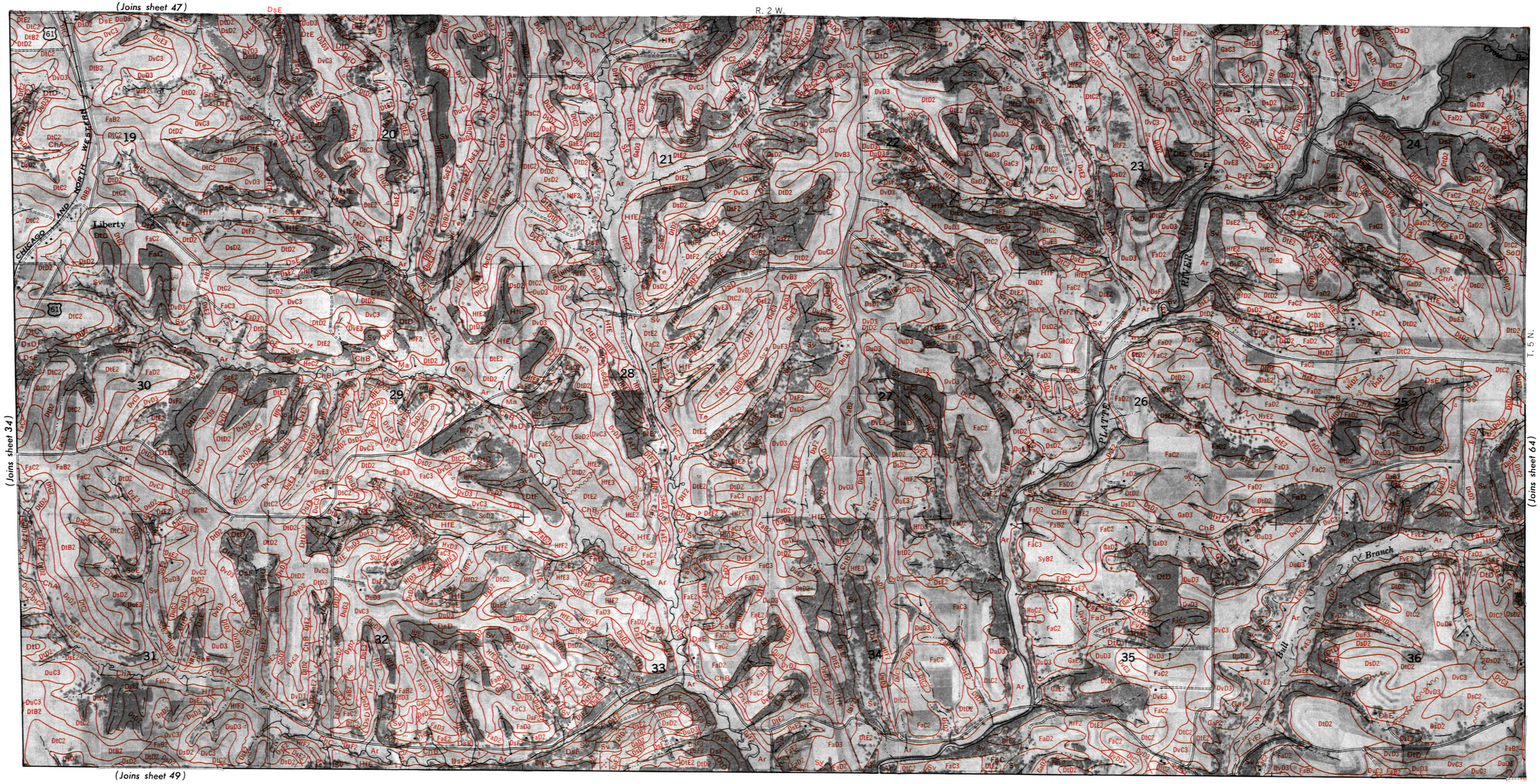
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1965.

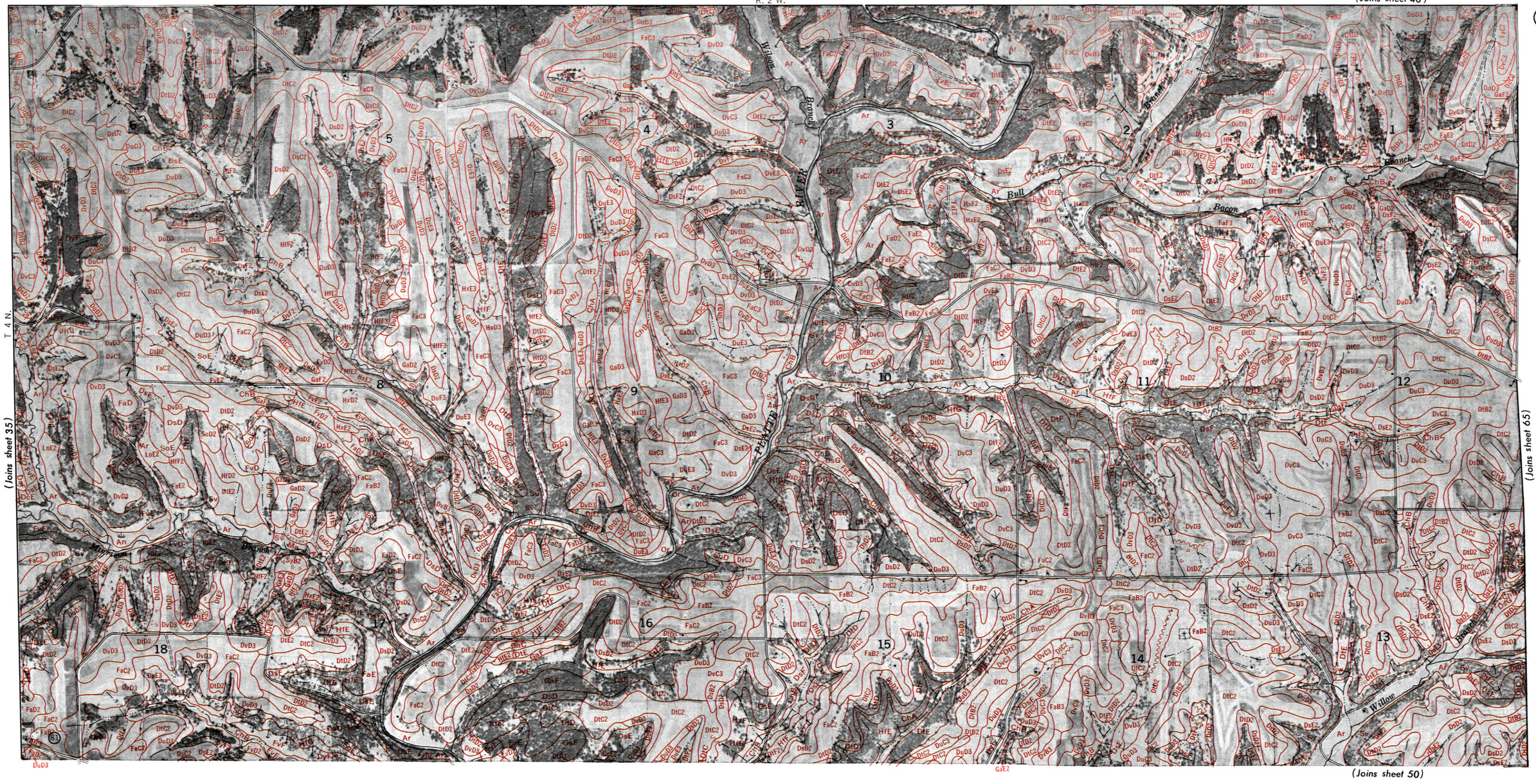
0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 48





0 ½ 1 Mile

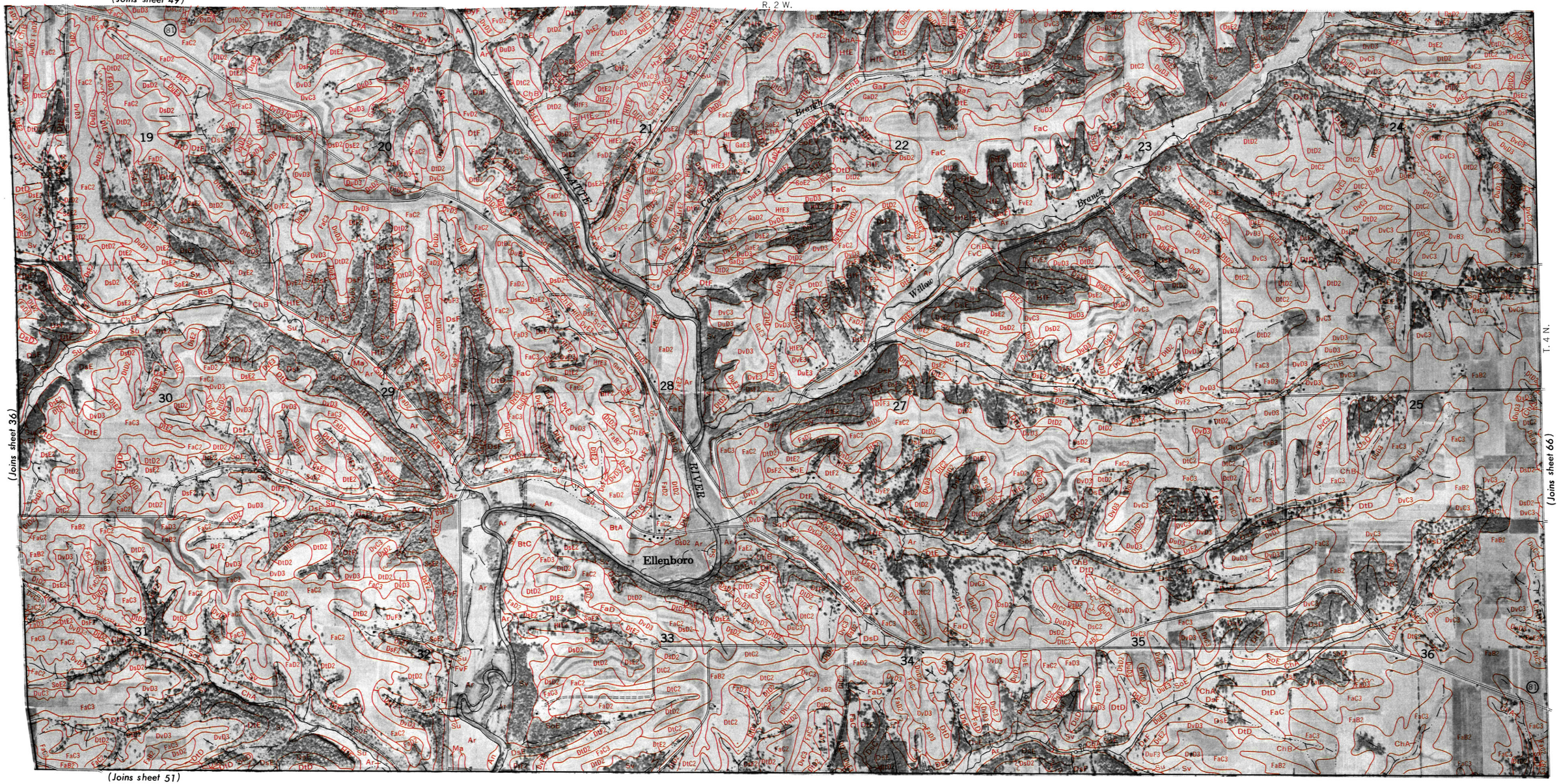
Scale 1:20 000

0 5 000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 50



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

Scale 1:20000

0 ½ 1 Mile

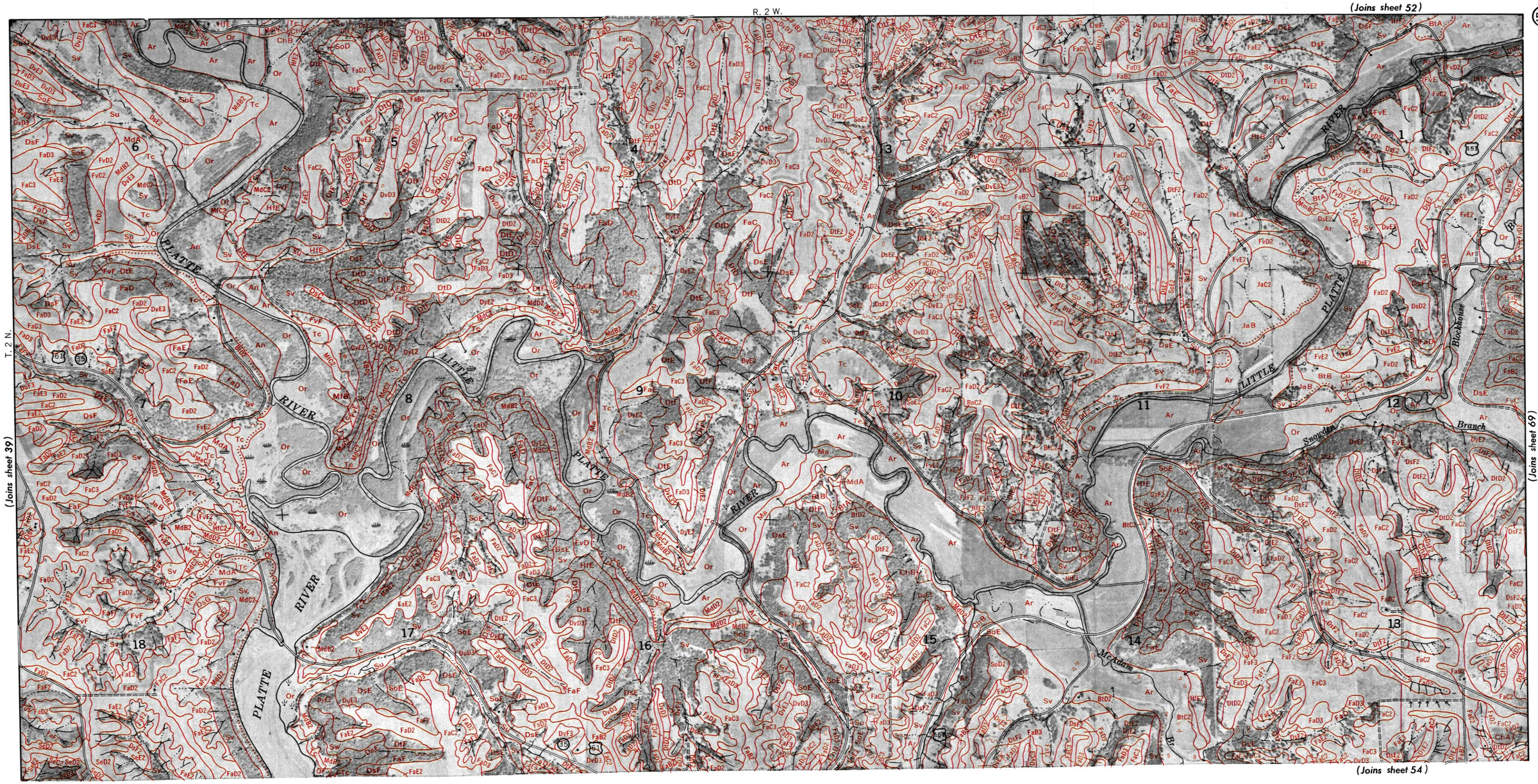
0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 53



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U.S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 54

(Joins sheet 40) | (Joins sheet 54)

R. 2 W

55

N

T. 1 N.

(Joins sheet 71)

(Joins sheet 56)

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

Jamestown

Kieler

Louisburg

MISSISSIPPI RIVER

DUBUQUE COUNTY — IOWA

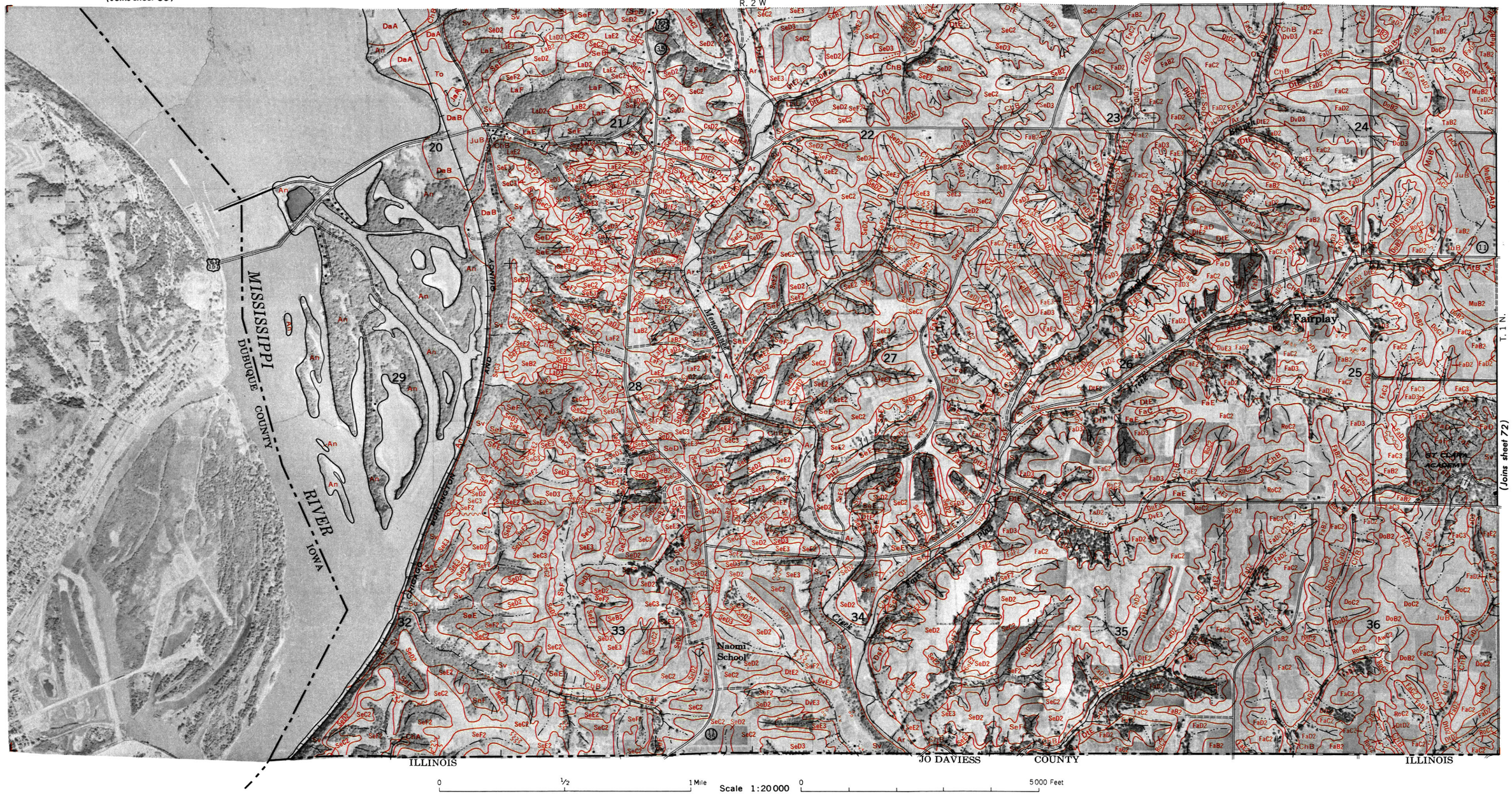
CHICAGO, BURLINGTON AND QUINCY R.R.

Scale 1:20000

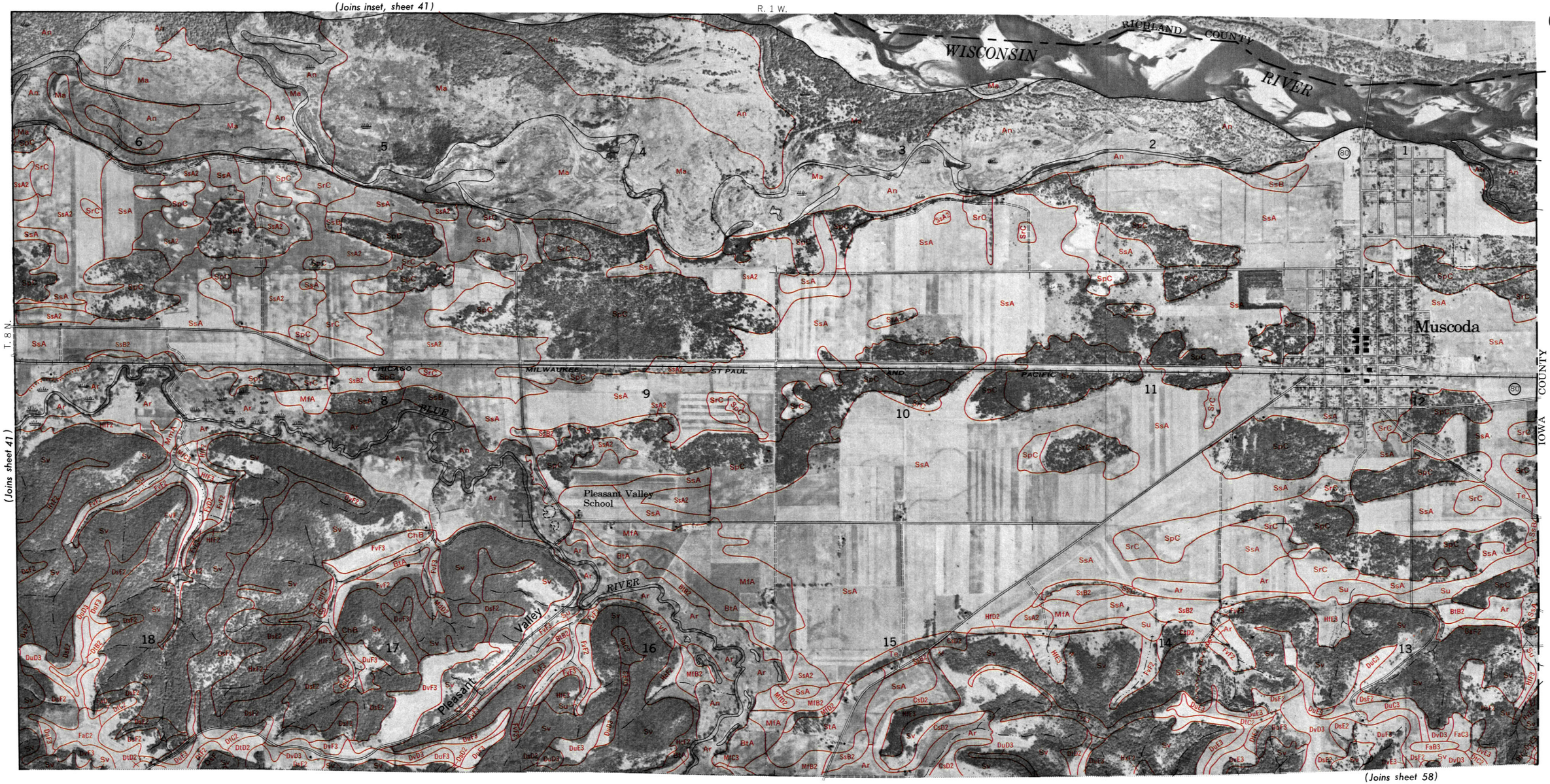
0 1/2 1 Mile

0 5000 Feet

(Joins sheet 55)



(Joins sheet 72)



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1956.

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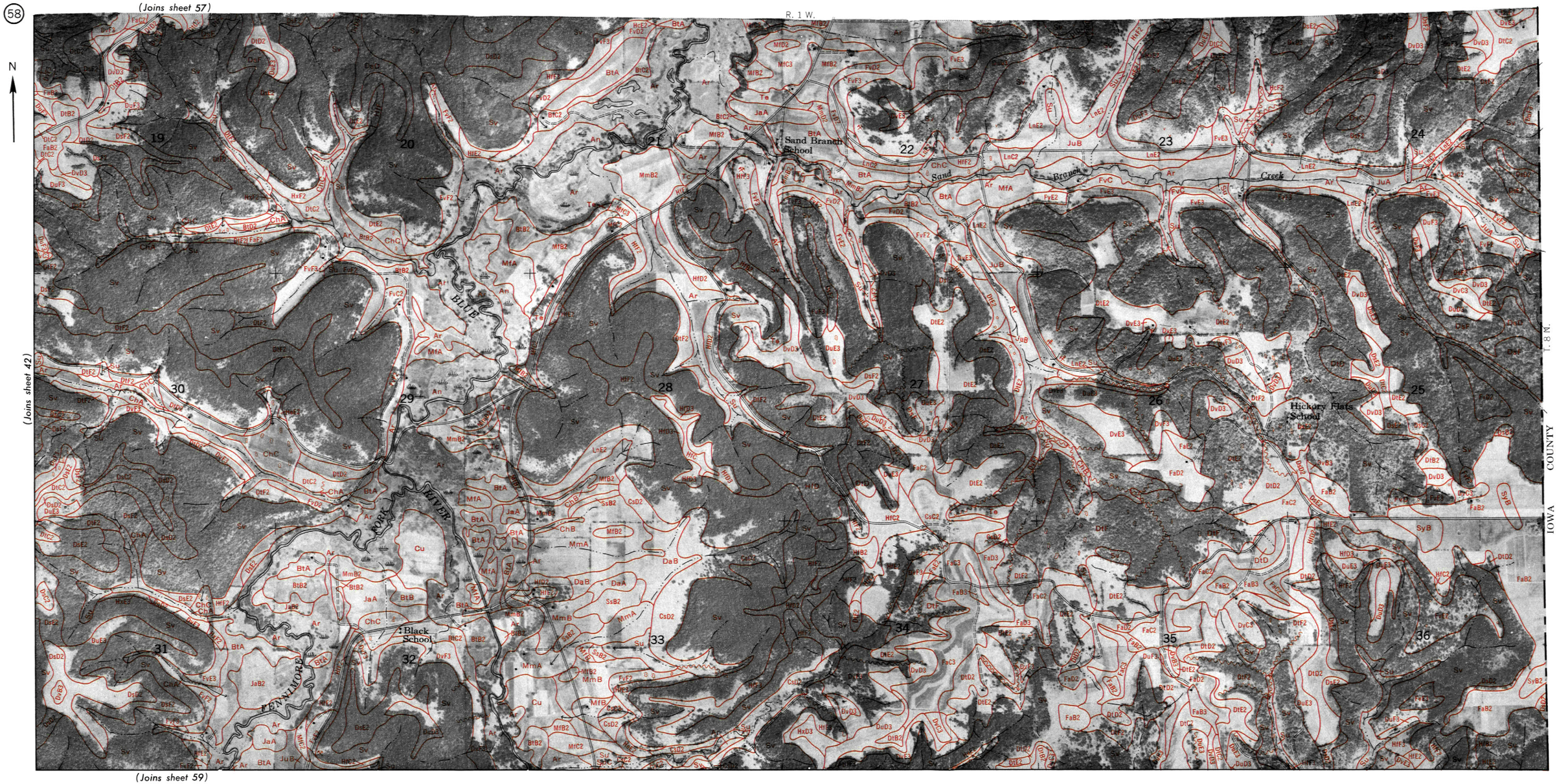
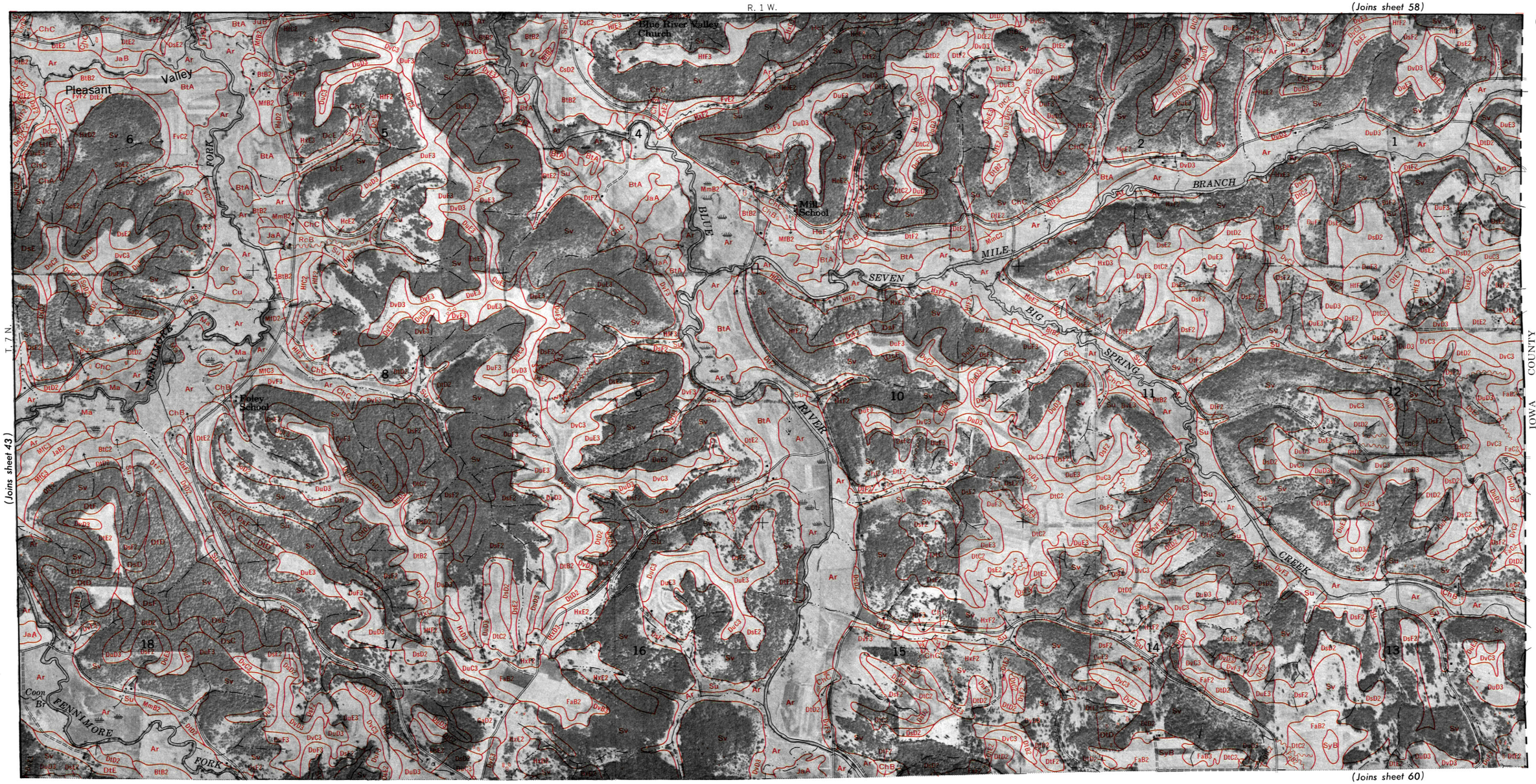


0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 59



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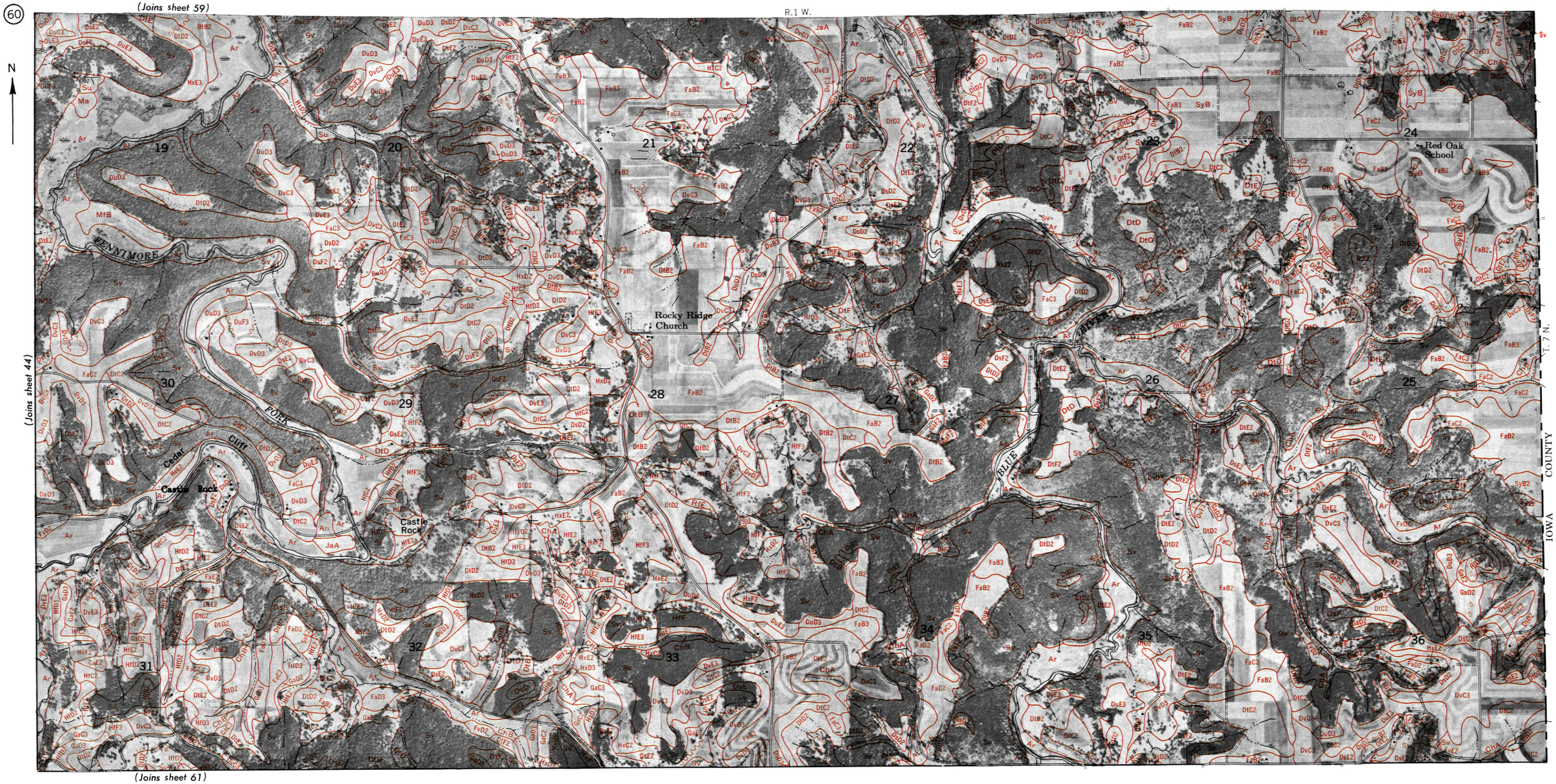
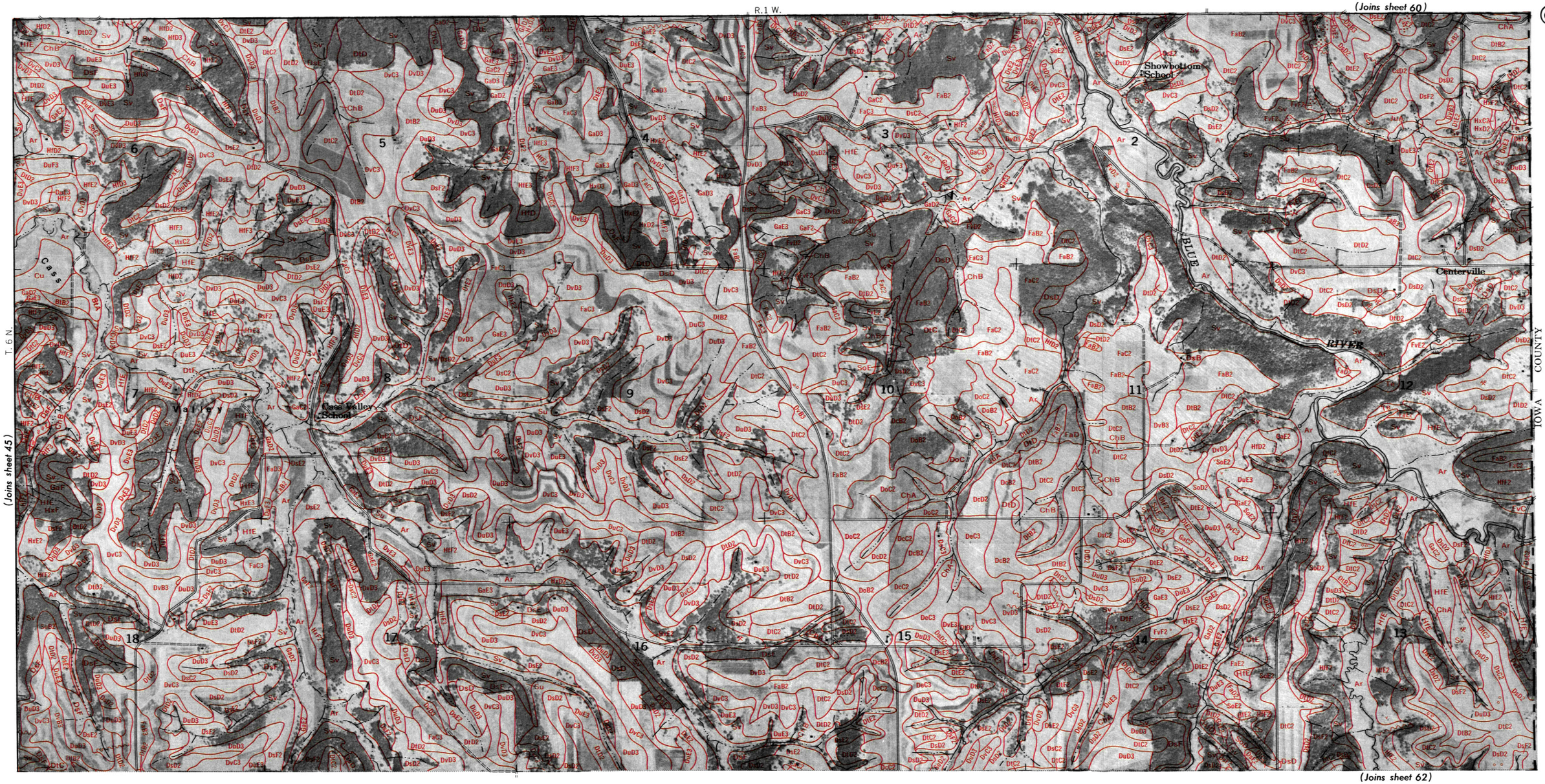
Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 60



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 61



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

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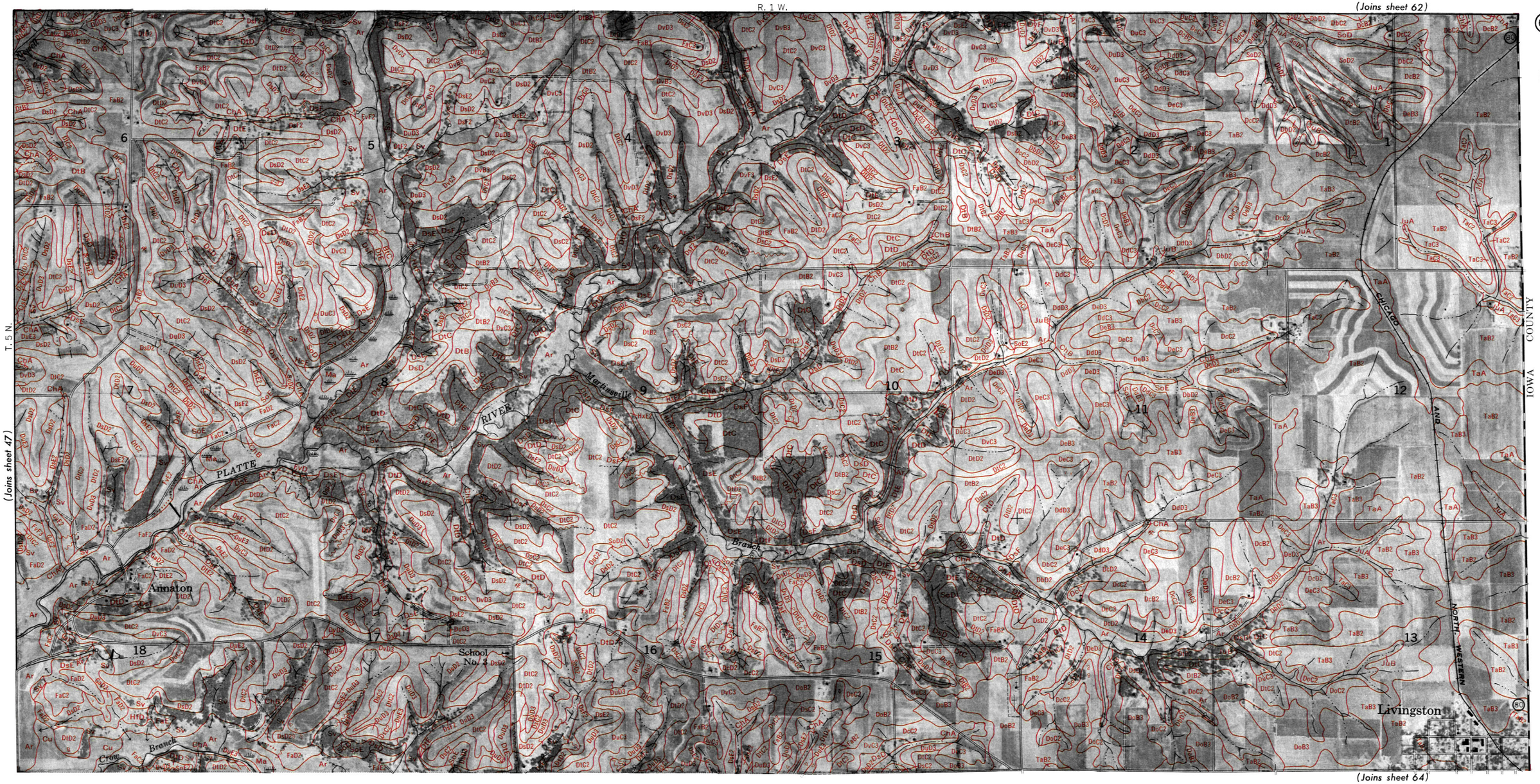
GRANT COUNTY, WISCONSIN—SHEET NUMBER 62

GRANT COUNTY, WISCONSIN—SHEET NUMBER 63



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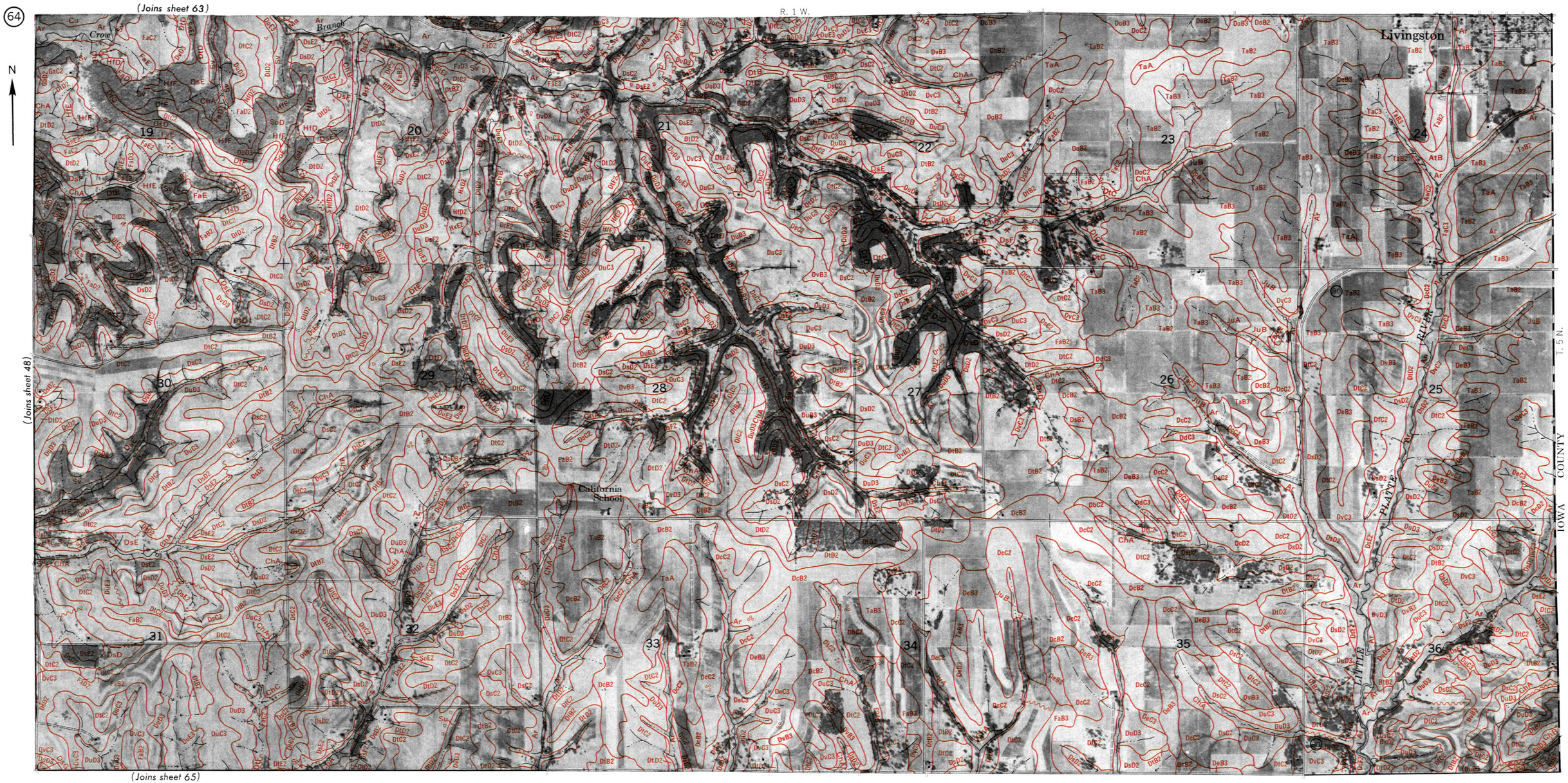
GRANT COUNTY, WISCONSIN—SHEET NUMBER 64

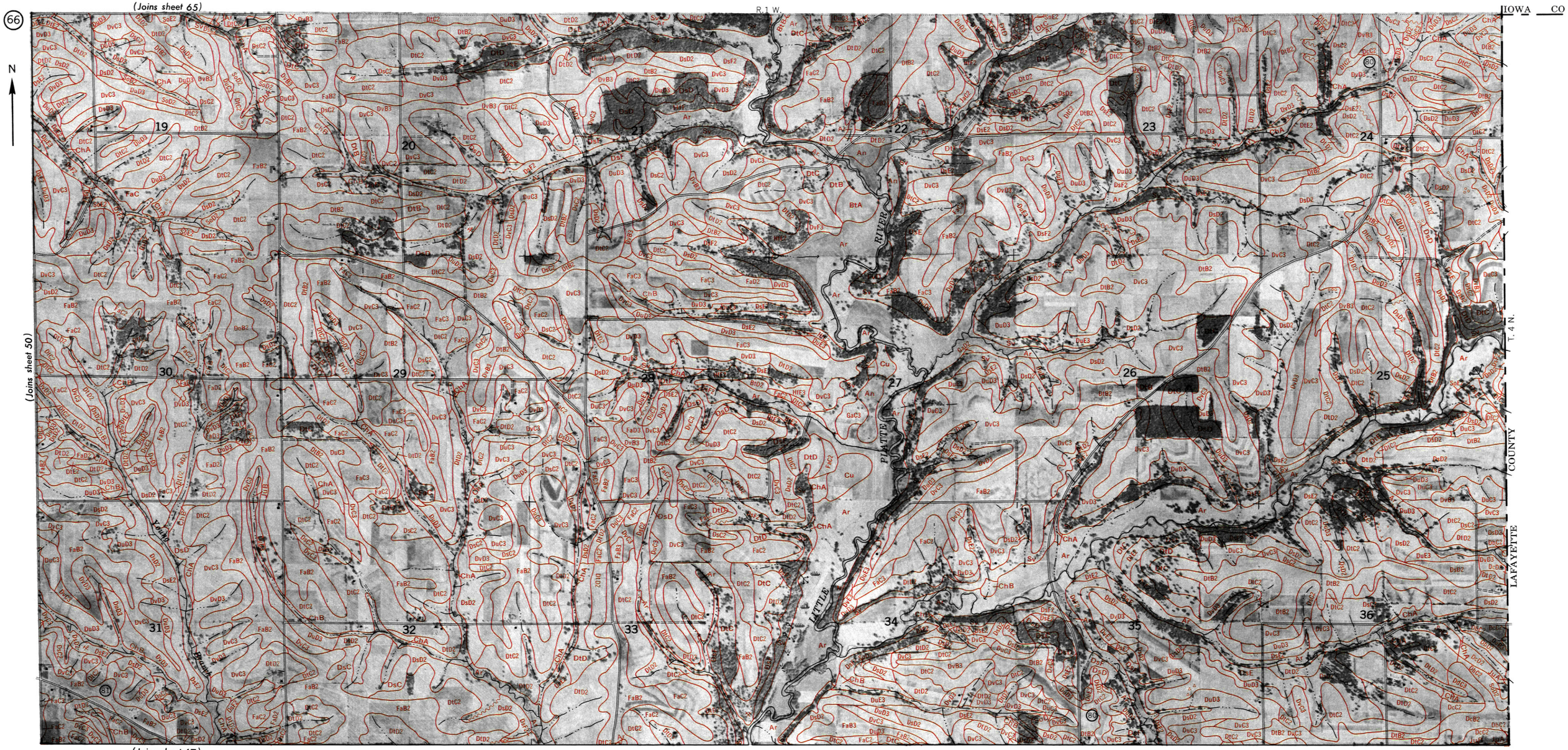


0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 65

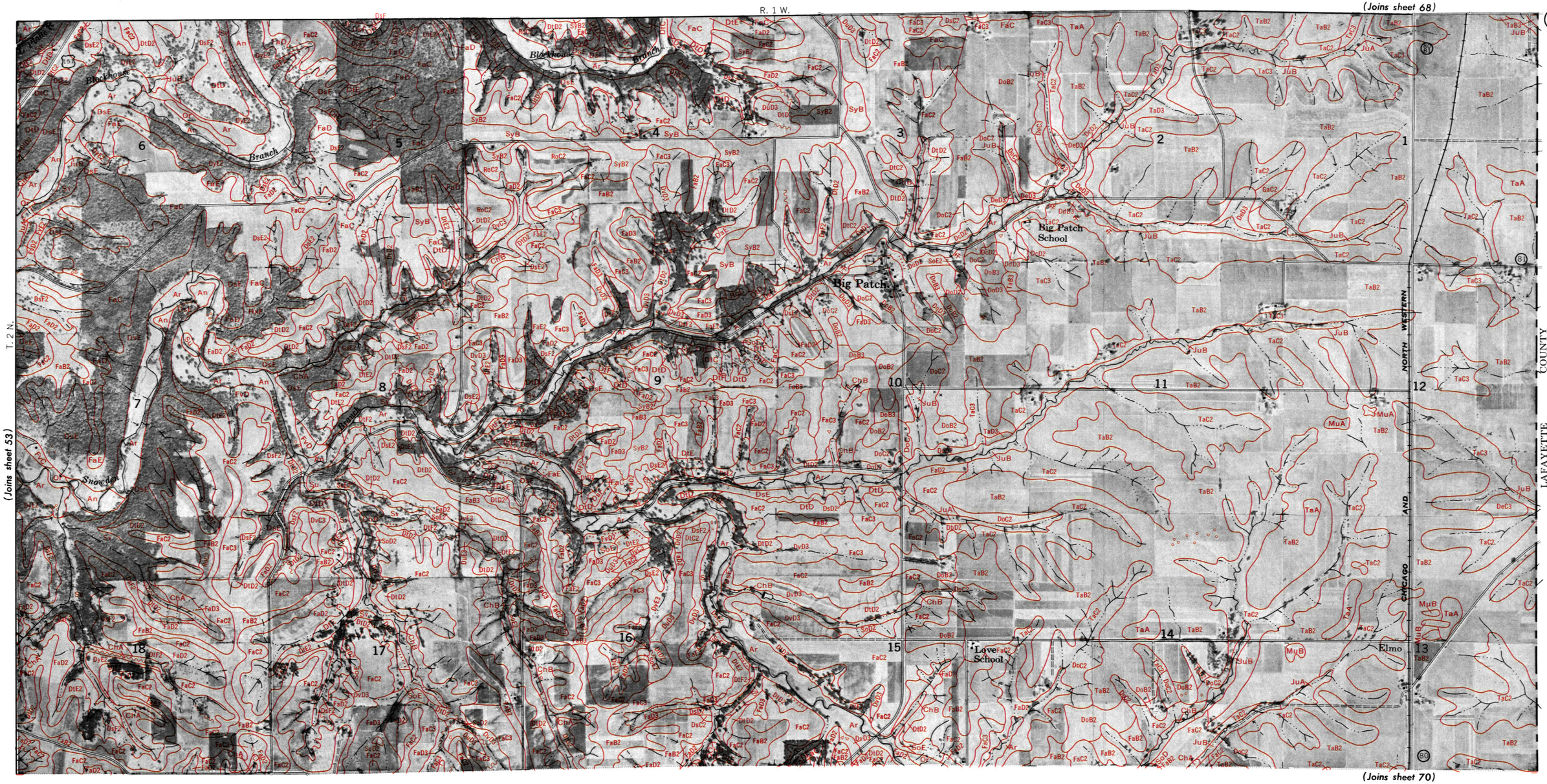

(Joins sheet 65)
R.1 W.
IOWA CO
66
N
19
20
21
22
23
24
30
29
28
27
26
25
31
32
33
34
35
36
RIVER
PLATTE
LITTLE
T. 4 N.
COUNTY
LAFAYETTE
(Joins sheet 50)
(Joins sheet 67)
0
½
1 Mile
Scale 1:20000
0
5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

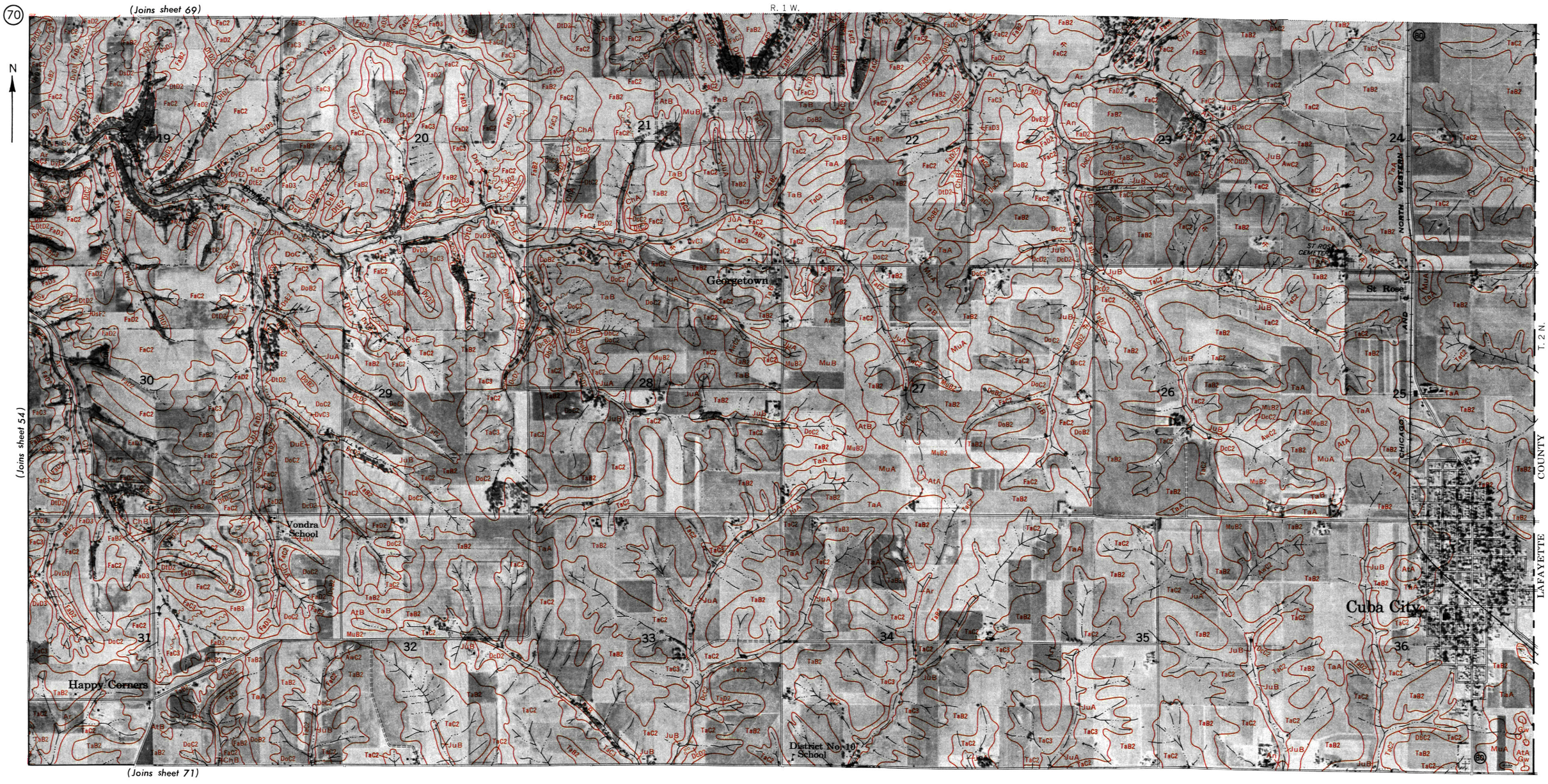
GRANT COUNTY, WISCONSIN—SHEET NUMBER 68

GRANT COUNTY, WISCONSIN—SHEET NUMBER 69



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.


70
(Joins sheet 69)
R. 1 W.
N
(Joins sheet 54)
(Joins sheet 71)
T. 2 N.
LAFAYETTE COUNTY
Georgetown
St Rose
Vondra School
Happy Corners
District No. 10 School
Cuba City
ST ROSE CEMETERY
NORTH WESTERN
CHICAGO
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
0
½
1 Mile
Scale 1:20000
0
5000 Feet

GRANT COUNTY, WISCONSIN—SHEET NUMBER 71

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

Range, township, and section corners shown on this map are indefinite.

GRANT COUNTY, WISCONSIN—SHEET NUMBER 72

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads

- Dual
- Good motor
- Poor motor
- Trail

Highway markers

- National Interstate
- U. S.
- State

Railroads

- Single track
- Multiple track
- Abandoned

Bridges and crossings

- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings

- School
- Church
- Station

Mines and Quarries

- Mine dump
- Mine tunnel opening
- Pits, gravel or other
- Prospect

Cemeteries

Dams

Levees

Tanks

Creamery

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams

- Perennial
- Intermittent, unclass.

Canals and ditches

Lakes and ponds

- Perennial
- Intermittent

Wells

Springs

Marsh

Wet spot

RELIEF

Escarpments

- Bedrock
- Other

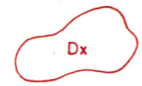
Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

Soil boundary and symbol



- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies
- Detrimental deposit
- Indian mound
- Small sand dunes